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1986

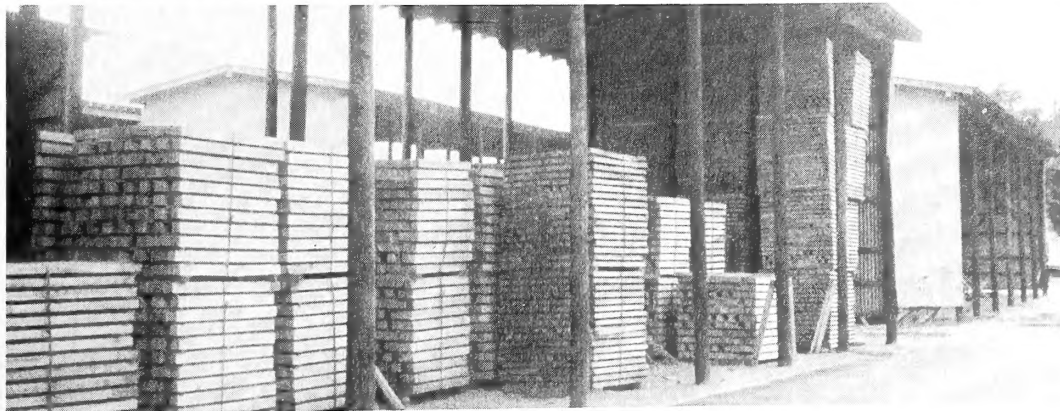
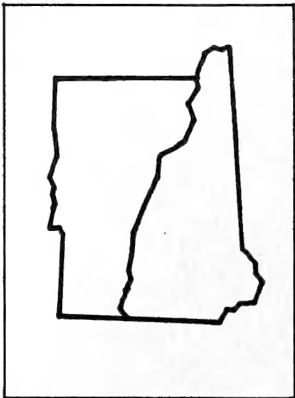
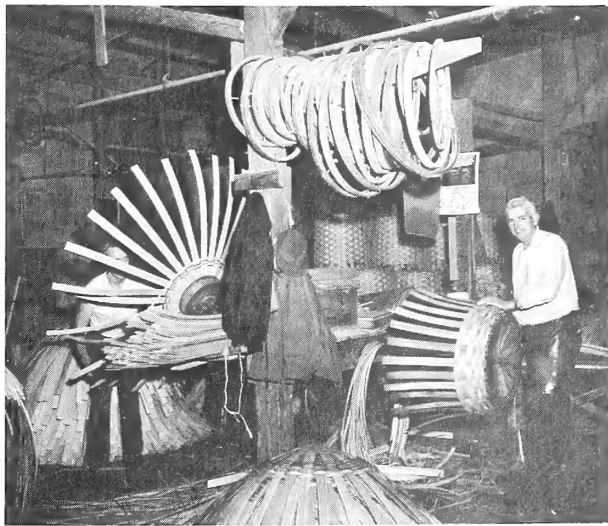
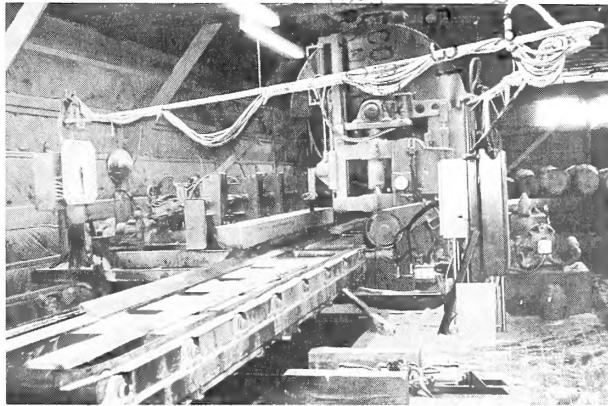


The Timber Industries of New Hampshire and Vermont

A Periodic Assessment of Timber Output

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Acknowledgements

The authors especially thank Eric H. Wharton, Research Forester with the Northeastern Forest Experiment Station at Broomall, PA, for his assistance in use of computers to compile and process the industry canvass data. Anne M. Malley verified the statistics in the text and verified and balanced the statistical tables. Carmela Hyland was responsible for administrative and secretarial services. Marie Pennestri typed the text for this report.

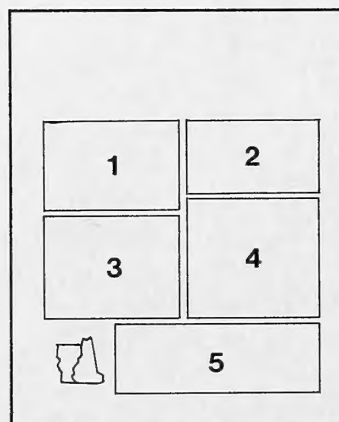
Manuscript received for publication 8 July 1985.

Abstract

This periodic evaluation of statewide industrial timber output is based on canvasses of the primary wood manufacturing plants in New Hampshire and Vermont. The report contains statistics on industrial timber products and plant wood receipts in 1982, and the production and disposition of the manufacturing plant residues that resulted. The 129.4 million cubic feet (3.7 million m³) of industrial wood produced in New Hampshire and Vermont in 1982 represented a 50 percent increase in production since 1972, when similar information was last collected in detail. Production and receipts of all major industrial roundwood products increased during the period. Other trends in industrial product output and the use of manufacturing residues are presented, along with 25 statistical tables.

Cover photographs

Most of the industrial roundwood timber products harvested in New Hampshire and Vermont still are used to make traditional solid wood products, many for home building or use in the home. Both modern and traditional equipment and methods are employed to harvest the roundwood, to convert it into high-quality products, and to prepare them for market. In the photographs 1, 2, and 5, a modern skidder transports tree-length logs from the woods for conversion into roundwood products; a double-cut bandsaw efficiently cuts softwood sawlogs into lumber; and furniture dimension parts are air-dried at a modern facility before shipment. In photographs 3 and 4, a drawknife is used to hand-peel white pine cabin logs, and ash and oak splints are hand-woven into baskets. (Photographs are courtesy of the Department of Forest Resources, University of New Hampshire and the Vermont Department of Forests, Parks and Recreation).



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NEW HAMPSHIRE AND VERMONT:
A Periodic Assessment
of Timber Output

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Highlights

The 1982 timber industry canvasses in New Hampshire and Vermont showed that:

In New Hampshire, since 1972:

* Total timber output increased by 46 percent to 73.2 million cubic feet (2.7 million m³).

* Sawlog production rose by a third to 242.6 million board feet.

* The total number of operating sawmills decreased by 14 to 128.

* Production of all forms of pulpwood increased. Total pulpwood production rose by 68 percent, reaching nearly 523 thousand cords. Roundwood production rose by 64 percent to almost 330 thousand cords, while the use of chipped residues rose by 75 percent to 193 thousand cords.

* Veneer log production rose over three and one-half times to 7.3 million board feet.

* Combined production of other products such as cabin logs, piling, poles, and stock for dimension, turnings, shingles, and miscellaneous other items rose by nearly two and one-half times to 5.6 million cubic feet.

* Nearly all of the total available wood manufacturing residues were used. The proportion used for fuel nearly doubled.

In Vermont, since 1972:

* Total timber output jumped over one and one-half times to over 56 million cubic feet (1.6 million m³).

* Sawlog production rose by more than one-fourth to nearly 158 million board feet.

* The total number of operating sawmills increased from 170 to 223.

* Production of all forms of pulpwood more than doubled, reaching over 356 thousand cords. Roundwood production much more than doubled to 301 thousand cords, while the use of chipped residues rose by 76 percent to nearly 55 thousand cords.

* Veneer log production rose by one-half to 10.4 million board feet.

* Combined production of other products such as cabin logs, piling, poles, and stock for dimension, turnings, shingles, and other miscellaneous items increased by over one-sixth to 4.3 million cubic feet.

* Nearly all of the total available wood

manufacturing residues, especially the fine materials, were used. The proportion used for fuel more than doubled.

Background

The Forest Service of the U.S. Department of Agriculture conducts periodic forest surveys of all states to provide up-to-date information about the timber and related resources of the Nation. In the 14-state region served by the Northeastern Forest Experiment Station, all states have now been inventoried at least three times. Vermont is the first state in the Northeast to be inventoried for the fourth time. The latest inventory, conducted during 1982 and 1983, included a timber-industry canvass in 1983 to determine the output of timber products and the volume and disposition of primary wood-product plant manufacturing residues in New Hampshire and Vermont for 1982.

This report is a result of a 100 percent canvass of all primary wood-product manufacturers that were operating in the two states in 1982. Pulpwood production data were gathered as part of the Northeastern Station's annual survey of pulpwood producers in the Northeast. In cooperation with the Cooperative Extension Service at the University of New Hampshire and the Vermont Department of Forests and Parks, the Station assembled a list of all known primary wood manufacturing firms in the two states and firms outside these states that might possibly have used industrial roundwood from New Hampshire and Vermont during 1982.

The primary manufacturers in New Hampshire and out-of-state manufacturers were first contacted through a questionnaire mailed by the Northeastern Station. Any nonresponding manufacturer within the state was contacted by Cooperative Extension Service personnel. Nonrespondents outside the state were sent an additional questionnaire or contacted by telephone by Station personnel. Vermont primary manufacturers and possible out-of-state users of Vermont roundwood were contacted through a questionnaire mailed by the Department of Forests and Parks. The Department modified its annual forest product report to include information required for the Station's canvass. Any nonresponding manufacturer was sent an additional questionnaire or contacted by telephone by Department personnel.

This report deals mainly with statistics for 1982, the year of the most recent inventory, and for 1972, the year of the last previous inventory of the timber resources of New Hampshire and Vermont. Data for these years may not be representative for the various timber industries covered in this report. Documented production statistics for individual timber products, such as pulpwood, for intervening or previous years were included as appropriate for

comparison. Long-term production trends will be disclosed by repeated canvasses in the future. Until a data base is built up over time, the reader is cautioned to use the most recent statistics prudently.

Timber Industry Trends - A Perspective

The cutting and processing of timber in New Hampshire and Vermont have always been important to their economic development. In the late 1600's and 1700's, when the states were being settled, more than 95 percent of the land was forested. Currently, about 80 percent of the land area of New Hampshire and Vermont is covered with forests, which provide timber products to several large timber-using industries and many smaller ones. Throughout the years, the forests provided sources of income and timber products to local landowners and wood-using industries in the region, nation, and other countries. Timber products to make ships, buildings, pulp and paper, wood and paper-based containers, furniture, bobbins and spindles for the textile industry, woodenware, and tools and farm implements have long been vitally important to the development of the ¹ states and the use of their timber resource.

Softwood Use Trends

In the past, much of the production of the wood-using industries was from softwoods, especially white pine sawlogs. White pine and other softwoods still make up much of the sawlog production, but more spruce and fir and hardwoods also are being utilized for this purpose.

The most recent trends show increased use of softwoods for sawlogs, veneer logs, and roundwood for reconstituted-wood panel products. Recent strides made by the sawmill industry in New Hampshire and Vermont to gain more of the softwood lumber market resemble the progress that has been made in Maine and other states throughout the Northeast. The softwood lumber industry had been shifting steadily away from the region, and in the past, softwood lumber from outside the region was preferred to local lumber. But in recent years, local lumber has become more acceptable because of improved grading and quality standards, promotional efforts within the region, and rising transportation costs to bring softwood lumber into the region from outside. The lumber

industry now has a northeastern lumber-grading association which has helped capture markets previously supplied with southern or western lumber. More pine and other softwood logs are being used locally to make plywood-based products; and the recent start-up of a softwood plywood plant in nearby New York has provided a strong market for these logs. The construction of a wood-based panel plant on the Connecticut River in New Hampshire provided a good market in 1982 for low grade softwoods and aspen. The plant produces oriented-strand board, a type of waferboard from wood chips or "flakes", to compete with plywood and other particleboard construction products. Nearby Maine and Canada have a number of waferboard and plywood plants which have used limited amounts of softwood logs from Vermont and New Hampshire. Regional demand for lumber, plywood, and composition board has increased considerably in recent years, giving the timber-using industries of New Hampshire and Vermont a distinct marketing advantage.

Substantial capital investment has been made in sawmills, dry kilns, and planing mills to increase capacities and manufacture lumber products to strict quality standards (Fig. 1). In Vermont, there has been a resurgence of one-man portable sawmills, using circular and band-saws to supply local markets.



Figure 1.--Quality-assurance and consumer acceptance are foremost at this Vermont sawmill where spruce and fir lumber is planed, graded, grade-stamped, and sorted by grade. (Vermont Department of Forests, Parks and Recreation).

Hardwood Use Trends

Trends in the demand for hardwoods reflect the trends experienced by the major users of hardwood roundwood. The New England furniture industry has become more concentrated with fewer, larger plants located in limited areas of

¹For further background, see: Bones, James T.; Engalichev, Nicholas; Gove, William G. The timber industries of New Hampshire and Vermont. Resour. Bull. NE-35. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1974. 25 p.

the region as most furniture production has shifted to the South. This has lessened the demand for most northern hardwoods, except red oak and white ash. Recent trends in hardwood sawlog and veneer log consumption show a growing demand for red oak and ash, in both the domestic and export markets, and a declining demand for yellow birch and hard maple. New England red oak is especially desirable for furniture and kitchen cabinets for its attractive color and texture. The beech harvest has been declining and market conditions indicate that this trend will continue. In New Hampshire and Vermont, hardwood trees are also harvested extensively for pulpwood.

Although high-quality hardwood logs have become scarce, the sawmill and veneer industries have adapted to the manufacture and marketing of products from lower grade and smaller logs. Throughout the Northeast, advances in the harvesting and processing of both hardwoods and softwoods have encouraged their use for woodpulp.

Industry Strength

Thus, the present timber-using industries of New Hampshire and Vermont continue to provide a solid industrial base to the region. The industries that remain have increased their capacities and made better use of the timber resource. This has been brought about not only by expansion of present facilities and the use of improved harvesting and manufacturing technologies, but also by adapting to changes in the timber resource, product demand, marketing and transportation methods, and quality control. The industries' adaptability to changing circumstances, and their ability to strengthen old markets while capitalizing on recent economic opportunities indicates their strength and their potential for continued growth, development, and importance.

Industry Outlook

We believe the outlook for the timber industries of New Hampshire and Vermont is very good. With continued growth in the economy, we believe, the more important lumber and pulpwood segments, and the less important veneer and wood-panel segments, will become even more important, while the manufacture of miscellaneous products such as cabin logs, rustic fencing, dimension and turnstock, poles, and specialty items will remain relatively stable or sustain growth. Resources appear to be available in New Hampshire and Vermont to support further expansion of these industries. There appears to be more opportunity for the wood-panel segment if modernization, capital improvements, and presently available new manufacturing technologies -- particle geometry, continuous presses, forming, and press control -- are employed in this segment. The composition of the New Hampshire pulp and paper industry and its product mix of high-quality and specialty

products indicate long-term stability for the industry, steady demand for its products, and continued use of low-grade hardwoods and plant residues. The turnery and dimension segment should grow as technology continues developing to utilize the abundant lower quality hardwood resource. No significant change is expected among the remaining miscellaneous segments, such as cabin logs, fencing, shingles, clapboard, or other novelty and specialty items.

The Industrial Timber Harvest

In 1982, more than 129 million cubic feet (3.7 million m³) of industrial roundwood were cut from the timberlands of New Hampshire and Vermont.² This is half again as much as was cut in 1972 for timber-using industries. The proportion from each state remained about the same while the volume cut from each state increased. In both 1972 and 1982, New Hampshire supplied nearly three-fifths of the roundwood cut in the two states. This amounted to 50 million cubic feet in 1972 and 73.2 million cubic feet in 1982 for New Hampshire. Also, during the period, both the proportion and the volume from softwoods increased for both states. In 1972, one-half, (43 million cubic feet) of the combined harvest was from softwoods. In 1982, about 57 percent (73.8 million cubic feet) of the combined roundwood total came from softwoods.

Around the time of the 1972 timber industry survey, the percentage of softwoods harvested in the two states had been decreasing (Tables 11, 14, 20, and 23). Advances in technology in both harvesting and utilization, modernization and increased capacities at sawmills and pulp mills, the development of reconstituted-wood panels, increased use of spruce and fir, and the declining number of hardwood furniture plants in the area have likely contributed to a reversal in the species mix (Fig. 2).

Softwoods accounted for seven-tenths of the gain in the combined harvest for the two states and most of the gains for all products for the two states between 1972 and 1982. The largest softwood volume gains were for pulpwood and sawlogs, 14.4 and 12.9 million cubic feet, respectively. Forty-seven percent of the gain in the softwood harvest went for pulpwood and 42 percent went for sawlogs.

² Timberland, formerly known as commercial forest land, is forest land able to produce crops of more than 20 cubic feet per acre per year of industrial wood and not withdrawn from timber utilization. Definitions of industrial wood and other terms used in this report relating to the timber-using industries are found under Definition of Terms at the end of this paper.

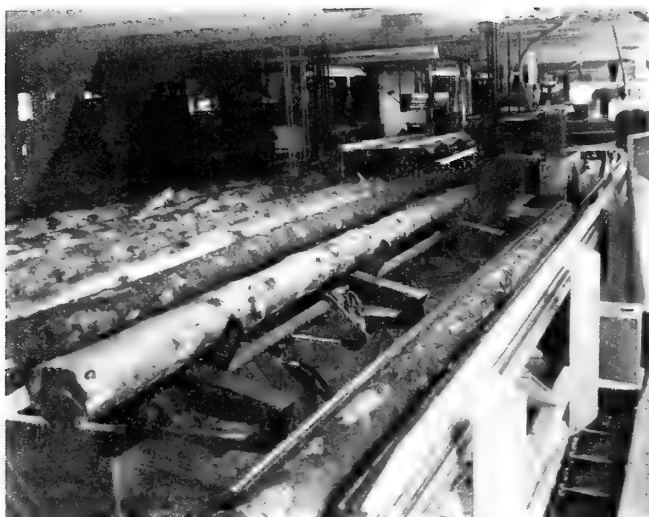


Figure 2.--Better use of the timber resource and sawmilling technology throughout New Hampshire and Vermont have likely contributed to greater softwood usage. Here a modern scrag sawmill utilizes twin circular saws to process small-diameter spruce and fir logs into lumber. (Vermont Department of Forests, Parks and Recreation).

As in 1972, about nine-tenths of the total timber harvested in New Hampshire and Vermont in 1982 was cut into sawlogs and pulpwood, with sawlogs again comprising the bulk of the combined roundwood cut in the two states in 1982. The remaining tenth was used for other products, such as veneer logs and bolts, cabin and tie logs, piling, poles, and stock for fencing, shingles, turned products, panel products, and miscellaneous other products.

Although proportions of the timber product groups have not changed since 1972, changes in processing technology and in the demand for various products have resulted in changes in industrial timber output from New Hampshire and Vermont (Fig. 1 and Tables 8 and 17). Advances in the manufacture of woodpulp, reconstituted-wood panel products, and veneer; increased demand for these products; and lessened demand for some other products have been primarily responsible for these changes.

While the total cubic-footage of sawlogs harvested in these two states increased by 26 percent between 1972 and 1982, the proportion of the sawlog harvest to the total roundwood harvest decreased by nearly a tenth as the cutting of trees into pulpwood nearly doubled. In 1972, pulpwood roundwood used about one-third of the total harvest, compared to nearly three-fifths for the sawlog portion. In 1982,

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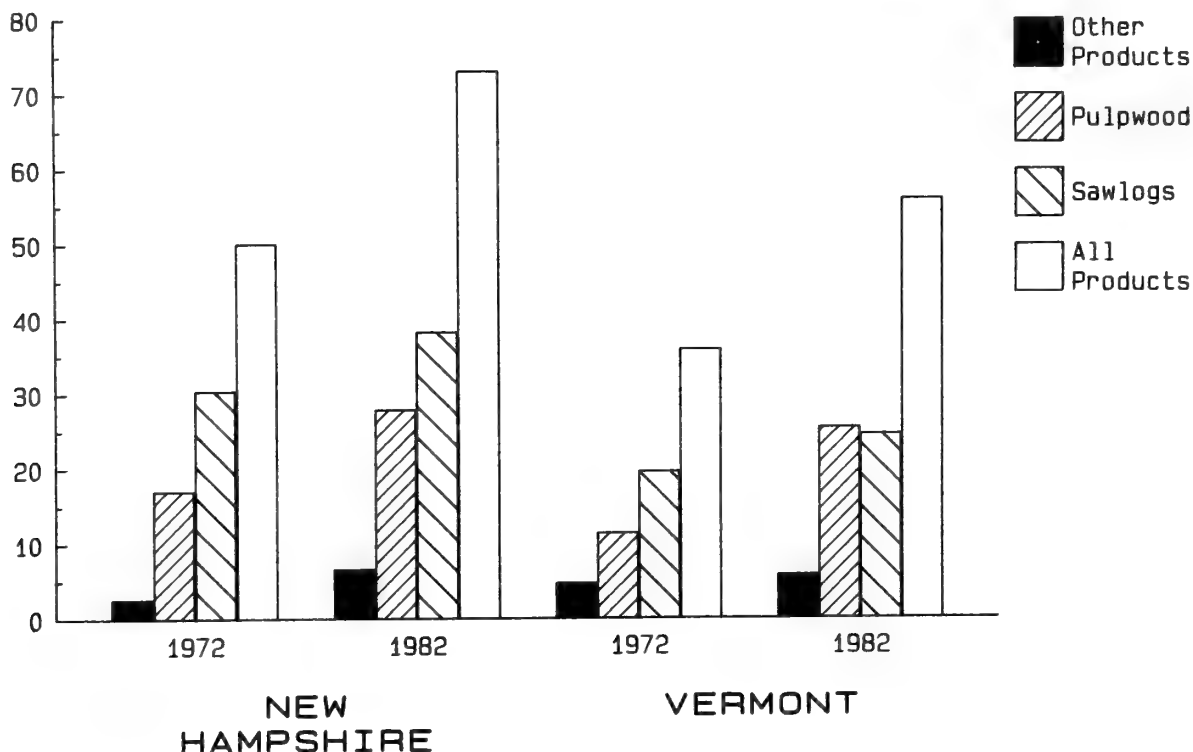


Figure 3.--Industrial timber harvest in New Hampshire and Vermont, by major product, 1972 and 1982.

the combined sawlog harvest for New Hampshire and Vermont comprised 63 million cubic feet, or 49 percent of the total industrial timber harvest for the two states. Since 1972, the combined pulpwood harvest for the two states rose from 28.6 million cubic feet to 53.6 million cubic feet for 41 percent of the total industrial timber harvest. The combined veneer-log production for the two states nearly doubled, from 1.5 million cubic feet in 1972 to 2.7 in 1982. Timber harvested for other products rose by 64 percent during the period, from 6.0 million cubic feet to 9.9, resulting mostly from the installation of the oriented-strand board manufacturing plant in New Hampshire.

In 1982, New Hampshire produced 73.2 million cubic feet of industrial roundwood, compared to the 56.2 million cubic feet from Vermont. This represents a 46-percent gain of 23.0 million cubic feet for New Hampshire and a 56-percent gain of 20.2 million cubic feet for Vermont. Most of the gains in each state resulted from increased sawlog and roundwood pulpwood production from softwood trees. In each state, the softwood pulpwood harvest was nearly 2-1/2 times that in 1972. Softwood sawlog production was up by nearly a third in New Hampshire and up by two-thirds in Vermont. The hardwood pulpwood harvest rose significantly in both states, while the output of hardwood sawlogs rose less than 10 percent in New Hampshire and dropped 6 percent in Vermont. The production of other roundwood products as a whole rose in each state, mostly because of significant increases in the utilization of softwoods for most of these products.

Although sawlogs continue to be a major timber product for both states, the sawlog harvest has been declining in importance, both in relation to total timber harvest and to roundwood pulpwood. The sawlog harvest had ranked first and the pulpwood cut had ranked second for both states in 1972. In 1982, sawlogs accounted for 52 percent and 44 percent of the industrial timber harvests in New Hampshire and Vermont, respectively, compared to 61 and 55 percent in 1972 (Fig. 3 and Tables 8 and 17). The 1982 pulpwood harvest ranked second in volume of timber harvested in New Hampshire (38 percent) and first in Vermont (46 percent). The changes in the importance of the sawlog and pulpwood harvests were brought about by the greatly increased utilization of roundwood unsuitable for sawlogs and the growing importance of woodpulp manufacture in the region. The sawlog harvest for both states rose during the 1972-1982 period, indicating that enough timber was available for conversion into lumber to meet expanding sawmilling needs.

In New Hampshire, softwoods made up nearly four-fifths of the state's sawlog production in 1982, while hardwoods supplied nearly three-fifths of its pulpwood harvest. For Vermont, nearly six-tenths of the sawlogs were from softwoods and just over half of the pulpwood was hardwood.

Most of the timber harvest, and the sawlog and pulpwood harvests, came from the northern counties of both states in 1982 (Fig. 4). The 51-million-cubic-foot harvest from New Hampshire's three northern counties comprised 39 percent of the combined harvest from both states--nearly the same proportion as in 1972, but 18 million cubic feet more volume. Vermont's eight northern counties produced 38 million cubic feet, 29 percent of the combined output.

New Hampshire Timber Harvest

In New Hampshire, industrial roundwood production had dropped by 41 percent, from 85 million cubic feet in 1952 to 50 million cubic feet in 1972. The drop was a result of decreased output of all products.

In the 10 years since 1972, the state's roundwood harvest rose to over 73 million cubic feet. The 46-percent rise came from increased output in all product categories and from both softwoods and hardwoods.

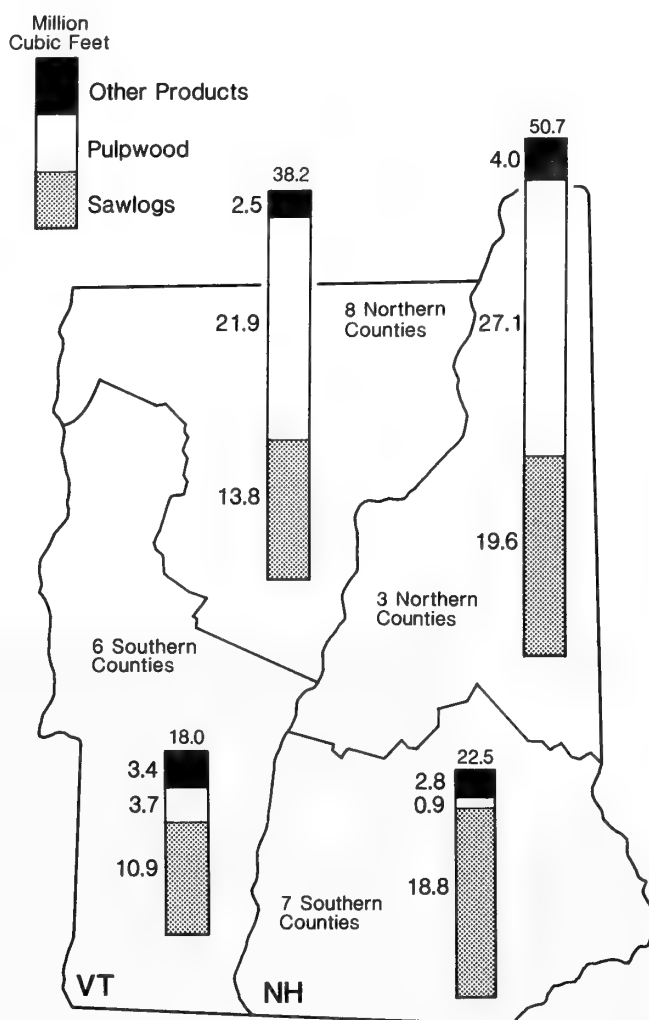


Figure 4.--Harvest of industrial roundwood in New Hampshire and Vermont, by geographic unit and major product, 1982.

In 1982, as in 1972, more of New Hampshire's timber harvest came from Coos County than from any other county in the state. Nearly 25 million cubic feet of industrial roundwood was produced in Coos County, more than one-third of the state's timber harvest. About two-thirds of the county's harvest went into pulpwood and more than one-fourth was sawlog material. The county pulpwood harvest of 16 million cubic feet exceeded by far that of any other New Hampshire county, and accounted for nearly three-fifths of the pulpwood cut in the state. The county ranked second in sawlog production, with 6.8 million cubic feet, or about 18 percent of the state's sawlog total. More sawlogs (9.1 million cubic feet) were cut in Grafton County, about one-fourth of the state's production. Coos County was also the largest producer of miscellaneous products, such as veneer logs and other types of roundwood.

Vermont Timber Harvest

In Vermont, industrial roundwood production had also dropped in the 20 years after 1952. During that period, the state's timber harvest dropped by nearly half, from 69 million cubic feet to 36 million cubic feet. The decline resulted mostly from reduced sawlog and veneer-log production.

During the last 10 years, the state's timber products output rose to 56 million cubic feet. The 56-percent rise was brought about by increased cutting for all product categories, particularly pulpwood, and increased harvests of both hardwoods and softwoods.

In 1982, as in 1972, more of Vermont's industrial roundwood was produced in Essex County than in any of the state's 13 other counties. Over 15 million cubic feet, or more than a fourth, of the state's total round timber products were cut in the county. Over three-

fourths of the county's timber harvest was for pulpwood and most of the balance was in the form of sawlogs. Essex county's pulpwood cut of nearly 12 million cubic feet far exceeded that of any other county, accounting for 45 percent of the state's roundwood pulpwood production. The county ranked first in sawlog production with 3 million cubic feet, followed closely by Windham and Windsor counties. Windsor led the state in the production of other roundwood products, such as cabin and tie logs, veneer logs, poles, and other items.

Mill Characteristics

The combined total of primary wood manufacturing plants that operated in New Hampshire and Vermont rose by 11 percent, from 361 in 1972 to 402 in 1982. The number of sawmills decreased in New Hampshire, primarily from a decline in the number of low-production mills. The number of Vermont sawmills rose during the period, with an increase in most production-size classes. In Vermont, there has been an increase in the number of small portable band and circular sawmills in recent years as availability of these mills has increased. In both states, as in most other states in the Northeast and in most other regions of the country, most of the lumber is produced by high-production mills making more than 1 million board feet annually. Most of the large-production mills saw softwood logs almost exclusively for construction products (Fig. 5).

The total number of other mills rose in New Hampshire, mostly because of an increase in the number of softwood cabin log manufacturers. The numbers of mills making veneer, woodpulp, turned products, and furniture dimension in the state remained the same. In Vermont, the total number of mills other than sawmills decreased. An increase in the number of manufacturers of cabin



Figure 5.--High-production sawmills in New Hampshire and Vermont produce primarily construction products. This Vermont mill uses twin circular saws to process spruce and fir sawlogs. (Vermont Department of Forests, Parks and Recreation).

logs and other softwood products was not sufficient to offset the reduction in mills making turnings, veneer, and dimension parts from hardwoods in the state.

The Lumber and Sawlog Segment

Both sawlog production and receipts in both New Hampshire and Vermont rose substantially between 1972 and 1982. The rises resulted from the increased volumes of both hardwood and, especially, softwood sawlogs cut and retained in each state for use by in-state sawmills. Like 1972, the year 1982 was generally a good year for the sawmill industry. There was heavy demand for both hardwood and softwood lumber products as the economy began to improve over the preceding couple of years. Improved harvesting and manufacturing technology, improved products, expanded and new markets, increased user confidence in well-manufactured northeastern lumber, and the recent establishment of a northeastern lumber manufacturer's association have contributed much to the continued and increased use of lumber products made from local timber. In years past, most of the softwood lumber used in construction in New Hampshire come from the western and southern states and the Lake States. Additionally, the demand and price for hardwood lumber has continued to be favorable since 1972, allowing only a slight reduction in the proportion of hardwood sawlogs in the total sawlog harvest (23 percent in 1982 as compared to 27 percent in 1972). Much of the hardwood roundwood that might previously have been used for other products was sawn into lumber. Although the proportion of the state's hardwood sawlog production to the total sawlog output declined slightly by 4 percent, the volume of hardwoods cut for sawlogs rose by nearly 15 percent, or 7.1 million board feet.

New Hampshire Sawlogs

As in the past, sawlog production in New Hampshire in 1982 was closely related to the manufacture of lumber from white pine and other softwood sawlogs. Nearly four-fifths, or 187 million board feet, of the state's 1982 sawlog production of 242.6 million board feet was from softwoods (Fig. 6). The volume of white pine sawlogs harvested had increased by about 32 million board feet since 1972, although the percentage of the total sawlog production remained at 53 percent. White pine made up about 70 percent of the softwood sawlog harvest in 1982.

The use of spruce and fir has continued to increase over the past 30 years, while the percentage use of hemlock, other softwoods, and hardwoods for sawlogs has remained fairly constant in recent years after undergoing some change between 1952 and 1972 (Table 11). In 1952, spruce and fir made up only 4 percent of the state's sawlogs; by 1972, their percentage use had nearly tripled; and in 1982, these

species contributed 15 percent of the total sawlog harvest.

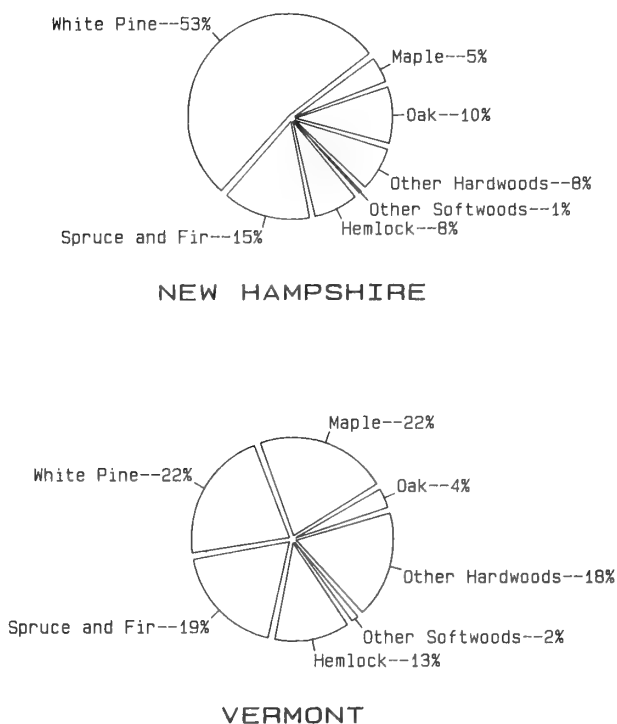


Figure 6.--Sawlog production, by species, in percent, 1982.

Over one-fifth (53 million board feet) of New Hampshire's sawlogs were shipped to manufacturers in other states (Tables 3 and 12). The state was a net exporter of both hardwood and softwood sawlogs--more logs of each species group were sent out of the state than were received from log processors in other states. Overall, over twice as many sawlogs were shipped out of state as entered the state. Most of the 53 million board feet of out-shipments and most of the 24.8 million board feet of in-shipments were from softwoods. Two and one-half times more softwoods were sent out than were received by in-state sawmills. Most of the out-shipments went to Vermont and Quebec, with each receiving more 20 million board feet of New Hampshire's sawlogs. Vermont was New Hampshire's largest trader, supplying 14.3 million board feet, about equally divided between hardwoods and softwoods.

Vermont Sawlogs

In Vermont, as in New Hampshire, the majority of sawlogs cut in 1982 were from softwood trees, but not nearly to the same extent. Historically, sawlog production in Vermont has

swung back and forth between hardwood and softwood dominance. The proportion of softwood and hardwood sawlogs to the state's total sawlog harvest reversed totally between 1972 and 1982; and much of the species mix was altered with the increased acceptance of softwood lumber. In 1972, hardwood sawlogs made up 56 percent of the sawlogs produced in Vermont. In 1982, softwoods made up that portion of the state's 157.9 million-board-foot production (Fig. 6). The proportion of white pine to total harvest remained about the same (22 percent), while the proportion of spruce and fir increased by 7 percent and that for other softwoods rose by 6 percent.

Between 1972 and 1982, the proportion of hard maple dropped by 8 percent. In 1982, the maples as a whole comprised 22 percent--5 percent less than hard maple did by itself 10 years earlier. All other hardwood sawlogs amounted to the same proportion as those cut from white pine or the maples.

Vermont was also a net exporter of sawlogs in 1982. A fourth (38.6 million board feet) of its sawlog production was shipped out of the state--over 5 million board feet more than was received by users within the state. The net export was attributed solely to the softwood export. Three and one-half million board feet less hardwood sawlogs left the state than came into it. Most of the out-shipments were softwoods to Quebec and New Hampshire. New Hampshire, in turn, supplied about six-tenths of the total sawlogs and four-fifths of the softwood sawlogs imported into Vermont.

The Pulpwood Segment

Total pulpwood production and the production of all forms of pulpwood from both hardwoods and softwoods in New Hampshire and Vermont have grown considerably over the past 11 years (Fig. 3 and Tables 8, 14, 17, and 23). The 631,000 cords of roundwood and the 248,000 cord equivalents of residue chips produced in these two states represent a gain of 84 percent from the total 478,000 cords produced in 1972. Between 1972 and 1982, increases of 170,000 cords, 125,000 cords, and 106,000 cord equivalents had occurred in softwood pulpwood, hardwood pulpwood, and chipped residues, respectively. In 1982, the combined volume of softwood pulpwood cut in the two states was nearly 2-1/2 times that harvested in 1972. The production of chippable residues supplied by other primary wood manufacturing plants in the two states for conversion into woodpulp rose by nearly 75 percent during the period. The hardwood pulpwood harvest rose by nearly 60 percent between 1972 and 1982.

Increased availability of timber and chippable material for use as pulpwood, advances in harvesting and pulping technologies, and increased raw material requirements and pulping capacities at neighboring woodpulp mills have

contributed significantly to these rises in pulpwood production in New Hampshire and Vermont. Most of the roundwood pulpwood comes from whole-tree chips made in the woods, from small diameter trees, and from the upper bole sections of trees from which higher valued logs and bolts have been removed. The harvesting of sawlogs and veneer and turnery logs and bolts would be unprofitable in many cases if pulpwood were not cut along with them because of the large volume of timber in dense small-diameter stands. The availability of plant residues for use as pulp chips increased because of increased sawlog receipts at sawmills within New Hampshire and Vermont and increased utilization of the residues, such as slabs and edgings, generated at these plants. In most states throughout the Northeast, existing pulpmills have increased their pulping capacities to meet the increased demand for woodpulp. The pulping capacities and raw material requirements at New Hampshire and Vermont mills, however, have remained about the same since 1972.

Both New Hampshire and Vermont exported more pulpwood than their pulpmills received in 1982; but the net export was considerably more for Vermont than for New Hampshire. About 19 thousand cords more were shipped out of New Hampshire than were received by the state's mills. Nearly all of the 356,000 cords of pulpwood produced in Vermont in 1982 were sent to neighboring states, and the state's production depends on the requirements of the pulpmills in these other states.

Except for two recessionary periods, all pulpwood production in New Hampshire and Vermont has risen throughout most of the 1972-1982 period. Although New Hampshire's total pulpwood production was more in 1979 than in 1982, total production of pulpwood for both states combined was slightly lower in 1982 than in 1979 because of a slight drop in Vermont's use of both hardwoods and chipped residues. In 1979, the combined total for the two states reached record production of nearly 900,000 cords prior to the economic downturn of 1980 and 1981. The total combined pulpwood production for both states had declined during these two years as it had during a similar economic slowdown in the mid-1970's. The declines were brought about primarily by the decreased availability of chippable residues from sawmills and other primary wood-manufacturing plants, the reduction of woodyard inventories at the pulpmills, decreased demand for woodpulp and paper products, and decreased use of hardwood roundwood.

New Hampshire Pulpwood

In New Hampshire, the 1982 pulpwood harvest of nearly 330,000 cords was over half again as much as it was in 1972. About 79,000 cords of the increase were from softwood trees and 50,000 cords were from hardwoods. The softwood pulpwood harvest more than doubled. The hardwood production rose by 37 percent.

The volume of residues made into pulp chips rose by nearly 75 percent--an increase of 83,000 cords--to bring the state's total pulpwood production for 1982 to 523,000 cords. Nearly three-quarters of the total pulpwood production was from hardwood roundwood and plant residues (Fig. 7), and about equally divided between the two. Most of the residues were from softwood material. In 1982, the proportion of the softwood roundwood harvest in total production was up by 7 percent over 1972. The proportion of hardwood roundwood had dropped by 8 percent; and the relation of plant residues to total production remained about the same.

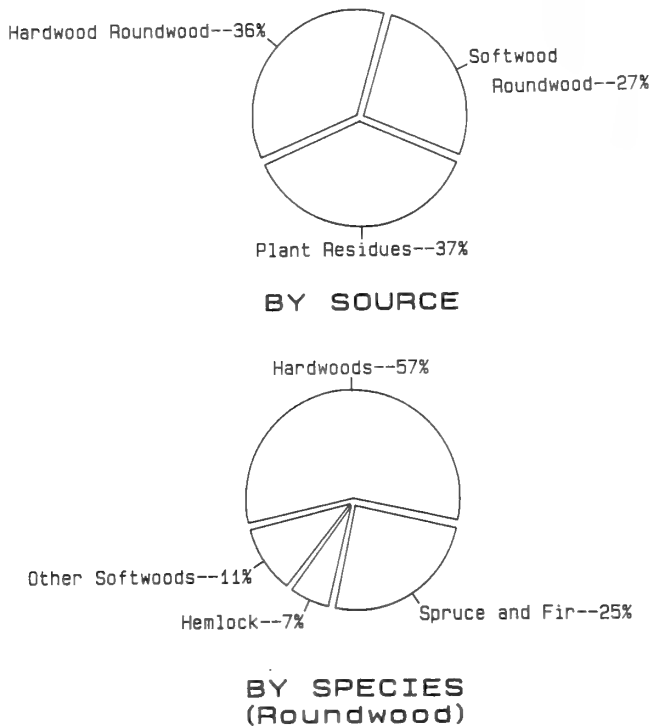


Figure 7.--New Hampshire pulpwood production, in percent, by source and species, 1982.

Softwoods comprised 43 percent of New Hampshire's pulpwood harvest in 1982--up by 11 percent over 1972. The proportion of spruce and fir remained about the same; the harvest of other softwoods accounted for softwoods' greater share. Nearly three-fourths of the softwood roundwood and over half of the plant residues produced in New Hampshire were sent to pulpmills outside the state. Most of the hardwood roundwood and hardwood residues were retained within the state. Nearly another 150,000 cords of hardwood roundwood was received by New Hampshire mills from log processors outside the state.

Thirty years ago, most of the pulpwood used in the state was softwood, preferred by the sulfite pulpmills. Today, the state's three remaining pulpmills use semichemical or sulfate processes

to make woodpulp from hardwood material (Fig. 8). These trends were present in 1972 and will likely continue as long as the existing mills in northern New England use their present pulping processes.



Figure 8.--Hardwood material, mostly roundwood, is used to make woodpulp at New Hampshire's pulpmills. Mountains of hardwood bolts dwarf the operations of this receiving yard at a northern New Hampshire mill. (University of New Hampshire Department of Forest Resources).

Vermont Pulpwood

Over the years, pulpwood production trends in Vermont have been similar to those in New Hampshire. Recently, the production of chippable residues increased by the same proportion (about 75 percent between 1972 and 1982), but the pulpwood harvest increased faster --in terms of both volume and percentage increases.

The 1982 Vermont pulpwood harvest of 301,000 cords was more than double the roundwood production of 1972. Between 1972 and 1982, the harvest of softwoods nearly tripled and the hardwood cut nearly doubled. About 91,000 cords and about 75,000 cords more of softwoods and hardwoods, respectively, were harvested in 1982 than in 1972. The production of chippable residues used to make woodpulp rose by nearly 24,000 cords.

Pulp chips from residues made up 16 percent of Vermont's pulpwood production (Fig. 9)--less than half of the residues portion for New Hampshire. Vermont had less available chippable residues and more of what it did have went unused or for fuel (Table 6). The remainder of the pulpwood production was about equally divided between hardwood and softwood roundwood. Between 1972 and 1982, the proportion of softwood roundwood had risen by 7

percent as the proportions of the hardwood harvest and the residues used dropped by 4 percent and 3 percent, respectively.

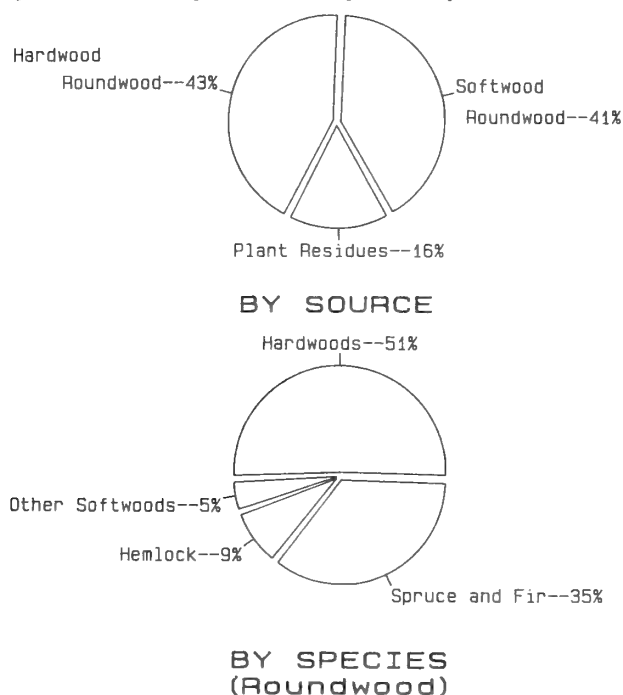


Figure 9.--Vermont pulpwood production, in percent, by source and species, 1982.

As in New Hampshire, the use of softwoods other than spruce and fir accounted for most of the rise; the proportion of spruce and fir remained about the same. Hardwood material made up about three-fifths of the chipped residue production.

Other Segments of the Timber Industry

The Veneer Log and Bolt Segment

In 1982, 17.7 million board feet of veneer logs and bolts were produced in New Hampshire and Vermont. This was nearly twice the board-foot volume cut in 1972, principally because New Hampshire's veneer-log harvest had risen by over three and one-half times.

The production increase in New Hampshire rose from 2 million board feet to 7.3 million board feet. In 1972, most of the state's veneer logs and bolts were shipped out of state, primarily to Vermont. In 1982, most of the state's production again was shipped outside, but considerably more logs were sent to Vermont than in 1972; and almost as many went to Massachusetts. More important, nearly as many logs were retained in New Hampshire in 1982 as were sent out in 1972. Of New Hampshire's 1982 veneer log harvest, 2.9 million board feet and 2.6 million board feet were shipped to Vermont and Massachusetts, respectively. A small amount went to Quebec; the balance was used by New Hampshire's specialty veneer mill.

Vermont's veneer log production rose by one-half during the period from 7.0 million board feet to 10.4 million board feet. Although one less mill was operating in 1982 than in 1972, the three mills remaining used 60 percent more logs in 1982. These mills received 6 million board feet more of veneer logs and bolts than were produced in the state--continuing to keep Vermont a large net importer of veneer logs and bolts. Thirty percent and 43 percent of the 9.6 million board feet of veneer logs and bolts received from out-of-state log processors came from New Hampshire and New York, respectively. New York was the largest trader of veneer-quality roundwood--receiving nearly 3 million board feet from Vermont. Most of the logs supplied to New York were pine that went to a recently constructed softwood plywood mill near the Vermont border. Vermont's mills used only hardwood roundwood--preferably red oak, yellow birch, and white birch--to make mostly interior and exterior veneer-based products, including large industrial reels, plywood, paneling, and face veneer. These three species made up 41 percent of Vermont's 1982 veneer-log production and 68 percent of the mills' receipts.

The Turnery and Dimension Bolt Segment

In 1982, there were numerous primary wood manufacturing plants in New Hampshire and Vermont that made a variety of turned and dimension products from hardwood bolts. The bolts were routed, turned, sawn, or otherwise shaped into blanks for such finished items as bobbins, bowls, dowels, pegs, spindles, tool handles, chair rungs, or squares for the furniture industry. Nearly 3 million cubic feet of bolts from New Hampshire and over 1 million cubic feet of bolts from Vermont were cut for these uses in 1982. This represented a tenth of New Hampshire's hardwood harvest and about 5 percent of the hardwood roundwood cut in Vermont. Except for about 1 million cubic feet of boltwood shipped from New Hampshire to Massachusetts mills, most of the boltwood harvest in New Hampshire and Vermont was used within the state or shipped between the two states. Most of the bolts were used for handles or furniture parts.

Before World War II, when New England was the center of the textile industry, there were many bobbin and spindle mills in New Hampshire and Vermont. As the textile industry moved south, all but two bobbin mills in Vermont and one in New Hampshire ceased operations. Thirty years ago there were 31 mills in the two states; 10 years ago there were five.

In 1982, few manufacturers remained from a once-thriving novelty and specialty products industry. In Vermont, there were two manufacturers of turned wooden bowls and one maker of baskets made from wood splints.



Figure 10.--Small volumes of roundwood from New Hampshire and Vermont are made into a number of miscellaneous construction products, such as cabin logs, rustic fencing, poles, and shingles. (Vermont Department of Forests, Parks and Recreation).

The Miscellaneous Construction-Products Segment

The bulk of the remaining 1982 roundwood production in New Hampshire and Vermont was used to make a variety of construction products other than lumber or plywood (Fig. 10). These include cabin logs, clapboard, fencing, piling, poles, shingles, landscape ties, and reconstituted-wood panel products. The production of roundwood from these two states for this segment had risen considerably since 1972, primarily as a result of the recent construction of a reconstituted-wood panel plant in New Hampshire. Roundwood harvests for all other construction products had declined since 1972 with their reduced demand.

One of the more important of the remaining construction-related roundwood products is precut cabin logs to make vacation and second homes (Fig. 11). Nearly 2 million board feet of cabin logs were cut in New Hampshire and nearly 3 million board feet were produced in Vermont. About half of New Hampshire's production was sent to Vermont's three high-production logcabin manufacturers. Most of the remainder was used by New Hampshire's largest log cabin manufacturer and several cabin log manufacturers in the state. Most of the cabin logs were made from white pine, with some spruce.

A limited volume of roundwood was harvested for Vermont's two clapboard mills. Additional

roundwood was flat-sawn into clap board at lumber-producing sawmills. Most of the clapboards produced by this once-thriving segment of the wood-products industry were used for period house reproduction and restoration.

The relatively new reconstituted-wood panel industry has done much to make use of much of the Northeast's underutilized timber resource of aspen and dead and dying fir and to provide impetus to the region's timber-using industry.³ About 2.3 million cubic feet of roundwood was cut in New Hampshire for the New Hampshire oriented strand-board plant. An additional 1.7 million cubic feet were harvested in Vermont for the mill, with more being supplied by log processors in neighboring states. Canada and Maine had similar plants making reconstituted-wood panel products which also drew roundwood from these two states.

³ Irland, Lloyd C. An update on reconstituted wood panels in New England. Unpublished paper presented at the Northeast fall section meeting of the Forest Products Research Society, West Lebanon, NH, November 3, 1982. Also see: Irland, Lloyd C. Reconstituted wood panel products outlook for New England and Maine. Augusta, ME: Maine State Planning Office, Executive Department; November, 1981, 31 p.



Figure 11.--Vermont's high-production log cabin manufacturers use most of the cabin logs produced in New Hampshire and Vermont. Here, one uses a four-man crew to erect a cabin on a prepared foundation in less than 4 days. (Vermont Department of Forests, Parks and Recreation).

The Use of Manufacturing Residues

Primary wood manufacturing residues, such as bark, chips, slabs, sawdust, and the like, have increased in utility and value throughout the Northeast over the years. Economic and environmental considerations have discouraged wood-product manufacturers from dumping or burning their residues in the open, and have encouraged the plants to use the residues or make them available for others to use.

Most of the residues generated by the primary manufacturing plants, such as sawmills, veneer mills, and turneries, in New Hampshire and Vermont are used. These plants and many other industrial facilities in these two states have been using the residue materials as readily available, dependable, alternative raw material sources for woodpulp and energy (Fig. 12). Gardeners, farmers, and landowners have been using much of the bark and smaller woody material for mulch, livestock bedding, and other similar purposes. Homeowners also have been using the larger material to heat their houses.



Figure 12.--A modern dry kiln at a New Hampshire sawmill uses an enclosed conveyor to carry wood residues to fuel the boiler system. (University of New Hampshire Department of Forest Resources).

Volume and Proportion of Residue Use

In 1982, nearly 44 million cubic feet (1.2 million m³) of residues were generated by the New Hampshire and Vermont primary wood manufacturers, excluding the woodpulp industry (Table 6).³ Nearly 37 million cubic feet (1 million m³), or 84 percent, of this total was woody material and about 6.9 million cubic feet (198 thousand m³) was bark.³ Over 24 million cubic feet (684 thousand m³) was coarse residue suitable for conversion into chips for wood pulp and fiber products.

Since 1972, the primary wood manufacturers and other wood residue users in New Hampshire and Vermont have made considerably more use of the residues generated in roundwood conversion. In 1972, the relation of residues used to the total residues available averaged 85 percent for the two states.

Between the states, the use of bark was 65 percent; coarse residue and fine residue usage were each 90 percent. In 1982, there was a very heavy demand for all types of residues, both the bark and the woody material, from the two states (Fig. 13). Very little of either residue type went unused in either state (Tables 6, 15, and 25) -- 98 percent of the residues generated by the two states were recovered and used. Of the two states, New Hampshire was somewhat more successful in the recovery of bark, coarse residues, and total residues.

Both the volume and the proportion of residues used in the two states for fuel have risen substantially over the years. In 1972, only 3.1 million cubic feet, or 13 percent, of the wood-industry residues were used for fuel. By 1982, the volume of the residues used for this purpose had nearly tripled, to 8.7 million cubic feet -- a fifth of the residue used. Nearly half of the remaining 34.5 million cubic feet of residues used in 1982 were made into woodpulp; the balance went for agricultural uses.

Between states, most of New Hampshire's residues went for fiber, while more of Vermont's was used for agricultural purposes:

General Analysis of Residue Use

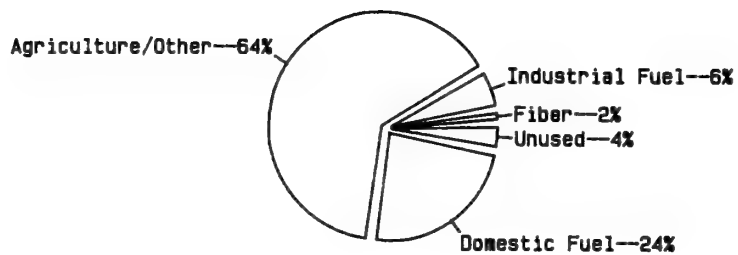
The bulk of the coarse residues from both states went for fiber manufacture. Because New Hampshire's pulpwood demands are much higher, much of Vermont's residues intended for fiber production went to New Hampshire pulpmills. The rest went to pulpmills in other states. Nearly all of the residues used to make pulp were woody material: most were from coarse residues; some from fine residues; nearly none from bark. Much of Vermont's coarse residues were used for fuel. Most of the bark and fine residues from both states were used for agricultural purposes, such as bedding, litter, and mulch.

Since 1972, proportionately much more of both New Hampshire's and Vermont's manufacturing plant residues are being used for fuel, while the unused portion that was buried, burned, or stockpiled for future use declined considerably (Fig. 14). During the 1972-1982 period, the proportion of these residues used for fuel rose by over 60 percent in New Hampshire and more than doubled in Vermont.

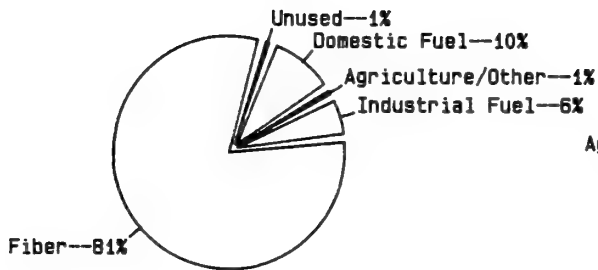
Proportionately much more of New Hampshire's manufacturing residues are being used to make woodpulp, and proportionately less of Vermont's goes into wood fiber. In 1982, about 60 percent more of the total plant residues were used for woodpulp in New Hampshire, while the proportion used in Vermont for this purpose dropped by about 9 percent. Since 1972, the proportion used for agricultural purposes decreased by 31 percent in New Hampshire and remained relatively unchanged in Vermont.

Residue production in the two states was closely related to the industrial roundwood production and receipts for each state. Sixty-four percent of the total residue production was from New Hampshire. Nearly 67 percent of the residues generated from lumber production were from New Hampshire, which produced and consumed about three-fifths of both the combined sawlog harvest and the combined sawlog receipts.

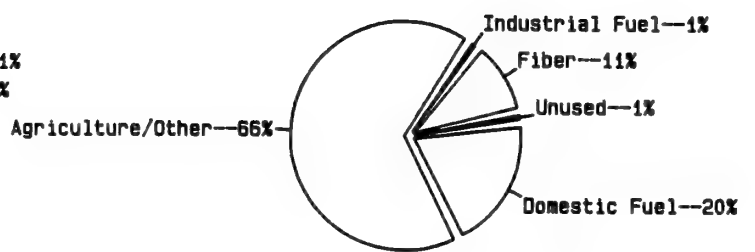
	Volume generated (million ft ³)	Fiber	Agricultural	Fuel	All uses
		-----Percent used-----			
New Hampshire					
Bark	3.9	3	74	21	98
Coarse	16.7	92	1	6	99
Fine	7.3	11	63	25	99
Total	27.9	59	27	13	99
Vermont					
Bark	3.1	0	52	40	92
Coarse	7.4	55	1	41	97
Fine	5.5	11	74	14	99
Total	16.0	29	36	32	97



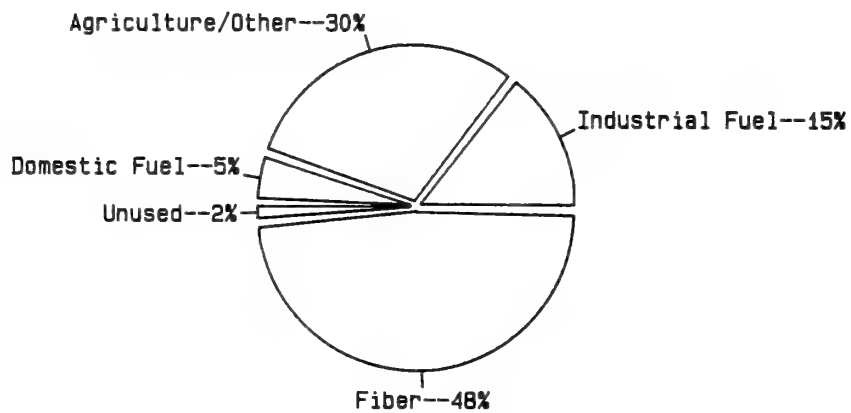
BARK



COARSE

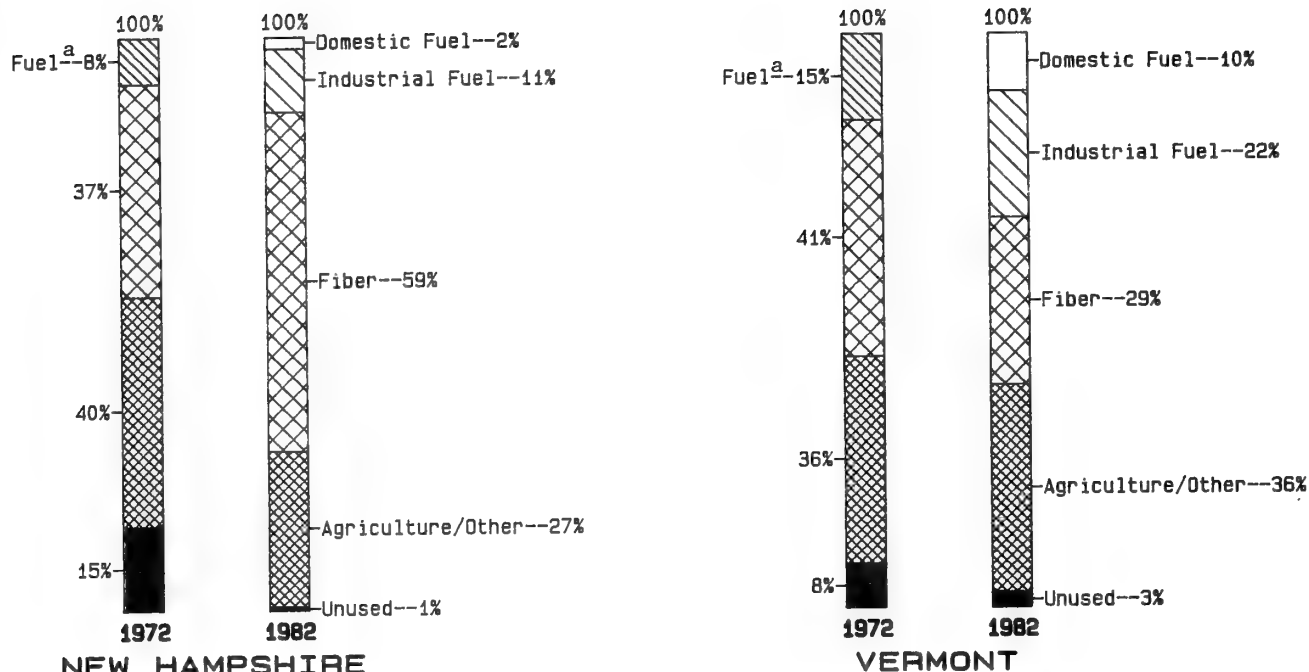


FINE



ALL TYPES

Figure 13.--Wood-manufacturing plant residue use, in percent, in New Hampshire and Vermont, by residue type, 1982.



^aIn 1972, residues for fuel were not segregated according to domestic and industrial use.

Figure 14.--Trends in wood-manufacturing plant residue use, in New Hampshire and Vermont, 1972 and 1982.

Definition of Terms

Harvest

Harvest. The aggregate volume of timber produced for industrial or consumer uses.

Timber products output. Includes roundwood (round timber) products harvested from growing stock on commercial forest land; from other sources, such as cull trees, salvable dead trees, limbs and tops, and saplings; from trees on noncommercial and nonforest lands; and from manufacturing plant byproducts.

Industrial timber harvest. Total production of round timber for conversion into wood products, except fuelwood.

Manufacture

Primary wood manufacturing plant. A plant that converts roundwood (round timber) to wood products such as woodpulp, lumber, veneer, cooperage, and dimension.

Roundwood products. Logs, bolts, and other round timber generated from harvesting trees for industrial or consumer use.

Industrial wood or roundwood. Logs, bolts, or other round timber generated from harvesting trees for use by the primary wood manufacturing industry, excluding round timber used to fuel industrial heating and power facilities.

Sawlog. A roundwood product, from which products such as lumber are sawn, and which meets certain standards of minimum diameter and length, and maximum defect, including a minimum 8-foot length and combination of size and defect specified in regional standards.

Pulpwood. Roundwood, mostly converted into 4- or 5-foot lengths, or chips and chipped plant residues that are used to make woodpulp.

Boltwood. Roundwood, mostly converted into 4- to 6-foot lengths, to be sawn into lumber at bolter-type sawmills, prepared for the manufacture of woodpulp, or used to make other products, such as cooperage, turned products, and veneer, from short, round timber.

Turnery log or bolt. A roundwood product from which blanks are sawn and turned, and that usually meets certain standards of minimum diameter and length, and maximum defect.

Veneer log or bolt. A roundwood product from which veneer is sliced or sawn, and that usually meets certain standards of minimum diameter and length, and maximum defect.

Cabin logs. Relatively slender round timber products cut to standard sizes and meeting specifications of strength, straightness, and soundness, finished for use in constructing cabins, barns, and other buildings.

Files (piling). Relatively slender structural round timber products cut to the maximum length possible within top-circumference and other specifications of strength, straightness, and soundness, to be driven or otherwise introduced into the soil, usually to provide vertical or lateral support in buildings, foundations, and other structures.

Poles. Round timber products cut to standard sizes and meeting specifications of strength, straightness, and soundness to be driven into the soil, usually to provide vertical or lateral support for electric power and telephone transmission lines.

Posts. Short, round timber products to be used in the upright position to support fence structures.

Roundwood production. The manufacture of roundwood (round timber) products, such as logs and bolts, from trees for conversion into wood products.

Roundwood receipts. The roundwood (round timber) products, such as logs and bolts, received by primary wood-manufacturing plants for conversion into wood products.

Residues

Manufacturing plant residues. Bark and woody materials that are generated when round timber (roundwood) is converted into wood products; includes slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screenings.

Plant byproducts. Wood products such as pulp chips, recycled from manufacturing plant residue.

Unused manufacturing residues. Plant residues that are dumped or destroyed and not recovered from plant byproducts.

Coarse residues. Manufacturing residues suitable for chipping, such as slabs, edgings, and veneer cores.

Fine residues. Manufacturing residues not suitable for chipping, such as sawdust and shavings.

Species

Softwoods. Coniferous trees, usually evergreen, with needles or scale-like leaves.

Hardwoods. Dicotyledonous trees, usually broad-leaved and deciduous.

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COMBINED
INDUSTRY
STATISTICS

Table 1.--Industrial roundwood production in New Hampshire and Vermont, by state, species group, and major product, 1982

State and species group	Sawlogs ^a	Pulpwood	Other products ^b	Sawlogs ^a	Pulpwood	Other products ^b	Sawlogs ^a	Pulpwood	Other products ^b
	<u>Thousand board feet^c</u>	<u>Standard cords</u>	<u>Thousand cubic feet</u>						
-----Thousand cubic feet-----									
-----Thousand cubic meters-----									
New Hampshire									
Softwood	187,026	142,663	2,309	29,940	12,126	2,309	847.9	343.4	65.4
Hardwood	55,559	186,868	4,434	8,466	15,884	4,434	239.8	449.8	125.6
Total	242,585	329,531	6,743	38,406	28,010	6,743	1,087.7	793.2	191.0
Vermont									
Softwood	87,892	148,057	2,723	14,070	12,585	2,723	398.5	356.4	77.1
Hardwood	69,975	153,239	3,177	10,664	13,025	3,177	301.9	368.9	90.0
Total	157,867	301,296	5,900	24,734	25,610	5,900	700.4	725.3	167.1
Both states:									
Softwood	274,918	290,720	5,032	44,010	24,711	5,032	1,246.4	699.8	142.5
Hardwood	125,534	340,107	7,611	19,130	28,909	7,611	541.7	818.7	215.6
Total	400,452	630,827	12,643	63,140	53,620	12,643	1,788.1	1,518.5	358.1

^aIncludes boltwood sawn into lumber.^bIncludes cabin and tie logs, cooperage and veneer logs and bolts, piling, poles, and stock for dimension, fencing, reconstituted-wood panel products, shingles, turned products, and miscellaneous novelty and specialty items.^cInternational 1/4-inch rule.

Table 2.--Change in industrial roundwood production
in New Hampshire and Vermont, 1972 - 1982

State and year	Sawlogs ^a	Pulpwood	Veneer logs	Other products ^b
	<u>Million board feet^c</u>	<u>Thousand standard cords</u>	<u>Million board feet^c</u>	<u>Thousand cubic feet</u>
New Hampshire				
1972	182.0	200.7	2.1	2,346
1982	242.6	329.5	7.3	5,631 ^d
Percent change	+33	+64	+248	+140
Vermont				
1972	125.2	135.5	7.0	3,699
1982	157.9	301.3	10.4	4,295 ^e
Percent change	+26	+122	+49	+16
Both states:				
1972	307.2	336.2	9.1	6,045
1982	400.5	630.8	17.7	9,926
Percent change	+30	+88	+95	+64

^aIncludes boltwood sawn into lumber.

^bIncludes cabin and tie logs, cooperage logs and bolts, piling, poles, and stock for dimension, fencing, reconstituted-wood panel products, shingles, turned products, and miscellaneous novelty and specialty items.

^cInternational 1/4-inch rule.

^dIncludes 2.3 million cubic feet of roundwood for conversion to chips for reconstituted-wood panel products.

^eIncludes 1.7 million cubic feet of roundwood for conversion to chips for reconstituted-wood panel products.

Table 3.--Sawlog production in New Hampshire and Vermont, by species group and destination of shipment, 1982
(In millions of board feet)^a

State and species group	Cut and retained in state	Shipped to:					Total production	
		Maine	Massachusetts	New Hampshire	New York	Vermont		Quebec
NEW HAMPSHIRE								
Softwood	146.8	0.8	4.6	-	-	12.9	21.9	187.0
Hardwood	42.8	b	4.9	-	-	7.8	.1	55.6
Total	189.6	0.8	9.5	-	-	20.7	22.0	242.6
VERMONT								
Softwood	62.8	b	0.2	7.6	0.2	-	17.1	87.9
Hardwood	56.5	-	.6	6.7	4.2	-	2.0	70.0
Total	119.3	b	0.8	14.3	4.4	-	19.1	157.9
^a International 1/4-inch rule.		^b Less than 50,000 board feet.						

^a International 1/4-inch rule.

^b Less than 50,000 board feet.

Table 4.--Sawlog receipts in New Hampshire and Vermont, by species group and origin of shipment, 1982
(In millions of board feet)^a

State and species group	Cut and retained in state	Origin of shipment					Total receipts	
		Maine	Massachusetts	New Hampshire	New York	Vermont		Quebec
NEW HAMPSHIRE								
Softwood	146.8	5.5	3.0	-	b	7.6	-	162.9
Hardwood	42.8	1.9	.1	-	-	6.7	-	51.5
Total	189.6	7.4	3.1	-	b	14.3	-	214.4
VERMONT								
Softwood	62.8	0.2	2.4	12.9	0.8	-	b	79.1
Hardwood	56.5	-	3.2	7.8	5.9	-	0.1	73.5
Total	119.3	0.2	5.6	20.7	6.7	-	0.1	152.6
^a International 1/4-inch rule.								^b Less than 50,000 board feet.

^a International 1/4-inch rule.

^b Less than 50,000 board feet.

Table 5.--Number of operating primary wood-manufacturing plants in New Hampshire and Vermont, by type of plant and sawmill production class, 1952, 1972, and 1982

Type of plant and production class	New Hampshire			Vermont		
	1952	1972	1982	1952	1972	1982
Sawmills:^a						
Under 50 thousand board feet	116	36	24	72	67	83
50 to 199 thousand board feet	85	26	25	102	34	65
200 to 499 thousand board feet	71	15	9	95	26	25
500 to 999 thousand board feet	78	11	16	69	6	12
1 million board feet or over	156	54	54	87	37	38
All production classes	506	142	128	425	170	223
Turnings and square mills	21	10	10	46	17	7
Pulpmills	3	2	2	2	1	1
Veneer mills	3	1	1	10	4	3
Other plants^b	24	4	12	5	10	15
All types of plants	557	159	153	488	202	249

^aBased on sawlog receipts.

^bIncludes manufacturers of cabin logs, piling, poles, reconstituted-wood panel products, fencing, shingles, and miscellaneous novelty and specialty items.

Table 6.--Production and disposition of manufacturing plant residues in New Hampshire and Vermont, by type of use, state, and type of residue, 1982

State and type of residue	Type of use				Total residues	Relationship of used residues to total residues		
	Fiber ^a	Agricultural ^b and other ^c	Industrial fuel	Domestic fuel			Total used	Unused
----- Thousand cubic feet -----								
----- Percent -----								
New Hampshire								
Bark	106	2,876	738	90	3,810	76		
Coarse ^d	15,506	140	613	397	16,656	89		
Fine ^e	811	4,592	1,798	4	7,205	59		
Total	16,423	7,608	3,149	491	27,671	224		
						27,895		
Vermont								
Bark	-	1,614	921	329	2,864	238		
Coarse	4,052	58	1,902	1,140	7,152	246		
Fine	612	4,089	737	55	5,493	22		
						5,515		
Total	4,664	5,761	3,560	1,524	15,509	506		
						16,015		
Both states								
Bark	106	4,490	1,659	419	6,674	314		
Coarse	19,558	198	2,515	1,537	23,808	335		
Fine	1,423	8,681	2,535	59	12,698	81		
						12,779		
Total	21,087	13,369	6,709	2,015	43,180	730		
						43,910		
						98		
						96		
						99		
						99		
						99		

Table 6.--continued

State and type of residue	Type of use					Total residues
	Fiber ^a	Agricultural ^b and other ^c	Industrial fuel	Domestic fuel	Total used	Unused
----- Thousand cubic meters -----						
New Hampshire						
Bark	3.0	81.4	20.9	2.6	107.9	2.2
Coarse ^d	439.1	3.9	17.4	11.2	471.6	2.5
Fine ^e	23.0	130.1	50.9	.1	204.1	1.7
Total	465.1	215.4	89.2	13.9	783.6	6.4
Vermont						
Bark	-	45.7	26.1	9.3	81.1	6.7
Coarse	114.8	1.6	53.9	32.3	202.6	7.0
Fine	17.3	115.8	20.9	1.6	155.6	.6
Total	132.1	163.1	100.9	43.2	439.3	14.3
Both states						
Bark	3.0	127.1	47.0	11.9	189.0	8.9
Coarse	553.9	5.5	71.3	43.5	674.2	9.5
Fine	40.3	245.9	71.8	1.7	359.7	2.3
Total	597.2	378.5	190.1	57.1	1,222.9	20.7
						1,243.6

^aIncludes woodpulp and composite products.^bIncludes livestock bedding, chicken litter, and farm and horticultural mulch.^cIncludes miscellaneous uses such as small dimension and specialty items.^dIncludes slabs, edgings, trimmings, veneer cores, and other material suitable for chipping.^eIncludes sawdust, shavings, and other material considered unsuitable for chipping.

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Table 7.--Industrial roundwood production in New Hampshire,
by species group and major product, 1982

Species group	Sawlogs ^a	Veneer logs	Pulpwood	Other products ^b
	Thousand board feet ^c		Standard cords	Thousand cubic feet
Hemlock	20,515	-	23,236	157
White pine	128,903	-	35,398	2,016
Spruce and fir	35,963	-	84,029	125
Other softwoods	1,645	-	d	11
Total softwoods	187,026	-	142,663	2,309
Ash	3,093	240	e	482
Aspen	345	21	20,287	355
Beech	2,941	34	e	281
White birch	5,632	4,376	e	1,112
Yellow birch	3,216	1,255	e	401
Elm	24	1	e	-
Hard maple	9,277	62	e	351
Soft maple	1,835	22	e	123
Oaks	24,536	1,056	795	207
Other hardwoods	4,660	206	165,786	10
Total hardwoods	55,559	7,273	186,868	3,322
All species	242,585	7,273	329,531	5,631

^aIncludes boltwood sawn into lumber.

^bIncludes cabin and tie logs, cooperage logs and bolts, piling, poles, and stock for dimension, fencing, shingles, reconstituted-wood panel products, turned products, and miscellaneous novelty and specialty items.

^cInternational 1/4-inch rule.

^dWhite pine pulpwood includes minor amounts of cedar, other pines and softwoods.

^eOther hardwood pulpwood includes hardwoods other than aspen and oaks.

Table 8.--Change in industrial roundwood production in New Hampshire, 1972 - 1982

Product	All species			Softwoods			Hardwoods		
	1972	1982	Change	1972	1982	Change	1972	1982	Change
	<u>Thousand cubic feet</u>		<u>Percent</u>	<u>Thousand cubic feet</u>		<u>Percent</u>	<u>Thousand cubic feet</u>		<u>Percent</u>
Sawlogs ^a	30,466	38,406	+26	22,649	29,940	+32	7,817	8,466	+8
Veneer logs	333	1,112	c	-	-	-	333	1,112	c
Pulpwood	17,060	28,010	+64	5,429	12,126	c	11,631	15,884	+37
Other products ^b	2,346	5,631	c	433	2,309	c	1,913	3,322	+74
Total	50,205	73,159	+46	28,511	44,375	+56	21,694	28,784	+33

^aIncludes boltwood sawn into lumber.

^bIncludes cabin and tie logs, piling, poles, and stock for dimension, fencing, reconstituted-wood panel products, shingles, turned products, and miscellaneous novelty and specialty items.

^cGreater than 100 percent increase.

Table 9.--Industrial roundwood production for New Hampshire,
by county, species group, and major product, 1982

(In thousands of cubic feet)

County and species group	Product			Total
	Sawlogs ^a	Pulpwood	Other ^b	
Belknap:				
Softwood	1,056	163	58	1,277
Hardwood	224	99	53	376
Total	1,280	262	111	1,653
Carroll:				
Softwood	3,118	3,249	10	6,377
Hardwood	579	3,402	463	4,444
Total	3,697	6,651	473	10,821
Cheshire:				
Softwood	2,278	177	451	2,906
Hardwood	1,349	1	98	1,448
Total	3,627	178	549	4,354
Coos:				
Softwood	4,827	6,111	53	10,991
Hardwood	1,935	9,932	1,747	13,614
Total	6,762	16,043	1,800	24,605
Grafton:				
Softwood	6,963	2,069	660	9,692
Hardwood	2,150	2,325	1,034	5,509
Total	9,113	4,394	1,694	15,201
Hillsborough:				
Softwood	2,674	10	66	2,750
Hardwood	537	18	68	623
Total	3,211	28	134	3,373
Merrimack:				
Softwood	3,418	49	250	3,717
Hardwood	496	36	222	754
Total	3,914	85	472	4,471
Rockingham:				
Softwood	1,674	110	3	1,787
Hardwood	394	67	1	462
Total	2,068	177	4	2,249

Table 9.--Continued

County and species group	Product			Total
	Sawlogs ^a	Pulpwood	Other ^b	
Strafford:				
Softwood	1,264	117	c	1,381
Hardwood	191	-	465	656
Total	1,455	117	465	2,037
Sullivan:				
Softwood	2,668	71	758	3,497
Hardwood	611	4	283	898
Total	3,279	75	1,041	4,395
All counties:				
Softwood	29,940	12,126	2,309	44,375
Hardwood	8,466	15,884	4,434	28,784
Total	38,406	28,010	6,743	73,159

^aIncludes boltwood sawn into lumber.

^bIncludes cabin and tie logs, piling, poles, and stock for dimension, fencing, reconstituted wood panel products, shingles, turned products, and miscellaneous novelty and specialty items.

^cLess than 500 cubic feet.

Table 10.--Sawlog production and receipts in New Hampshire,
by county and species group, 1982

(In thousands of board feet)^a

County	Production		Receipts	
	Softwoods	Hardwoods	Softwoods	Hardwoods
Belknap	6,596	1,468	15,446	1,446
Carroll	19,477	3,801	7,800	1,385
Cheshire	14,231	8,855	14,405	10,689
Coos	30,151	12,697	14,702	11,269
Grafton	43,494	14,109	33,116	15,101
Hillsborough	16,705	3,524	13,676	921
Merrimack	21,348	3,255	32,699	5,352
Rockingham	10,459	2,584	9,790	2,856
Strafford	7,899	1,254	11,699	1,035
Sullivan	16,666	4,012	9,603	1,374
All counties	187,026	55,559	162,936	51,428
All species	242,585		214,364	

^aInternational 1/4-inch rule.

Table 11.--Species composition of sawlogs produced in New Hampshire,
for selected years

(In percent)

Species	1905 ^a	1926 ^a	1952	1972	1982
Softwoods					
Hemlock	9	9	12	8	8
White pine	62	64	73	53	53
Spruce/fir	18	13	4	11	15
Other softwoods	1	-	-	1	1
Total	90	86	89	73	77
Hardwoods					
Beech	1	2	1	2	1
Birch	2	5	4	9	4
Maple	1	3	3	9	5
Oak	2	3	2	5	10
Other hardwoods	4	1	1	2	3
Total	10	14	11	27	23
All species	100	100	100	100	100
Volume of harvest (Million board feet) ^b	340.7	243.0	297.0	182.0	242.6

^aBased on lumber production.

^bInternational 1/4-inch rule.

Table 12.--Sawlog production in New Hampshire, by county, species group, and destination of shipment, 1982

(In thousands of board feet)^a

County and species group	Cut and retained in county	Logs shipped to:		Total production
		Other counties	Other states	
Belknap:				
Softwood	3,281	3,315	-	6,596
Hardwood	489	979	-	1,468
Total	3,770	4,294	-	8,064
Carroll:				
Softwood	6,083	11,810	1,584	19,477
Hardwood	1,005	770	2,026	3,801
Total	7,088	12,580	3,610	23,278
Cheshire:				
Softwood	8,911	2,425	2,895	14,231
Hardwood	6,583	689	1,583	8,855
Total	15,494	3,114	4,478	23,086
Coos:				
Softwood	6,321	434	23,396	30,151
Hardwood	8,269	702	3,726	12,697
Total	14,590	1,136	27,122	42,848
Grafton:				
Softwood	28,609	9,874	5,011	43,494
Hardwood	10,025	652	3,432	14,109
Total	38,634	10,526	8,443	57,603
Hillsborough:				
Softwood	9,003	7,559	143	16,705
Hardwood	605	2,855	64	3,524
Total	9,608	10,414	207	20,229
Merrimack:				
Softwood	17,810	3,538	-	21,348
Hardwood	2,605	650	-	3,255
Total	20,415	4,188	0	24,603

Table 12.--Continued

County and species group	Cut and retained in county	Logs shipped to:		Total production
		Other counties	Other states	
Rockingham:				
Softwood	7,688	1,924	847	10,459
Hardwood	2,334	247	3	2,584
Total	10,022	2,171	850	13,043
Strafford:				
Softwood	1,267	3,629	3,003	7,899
Hardwood	179	537	538	1,254
Total	1,446	4,166	3,541	9,153
Sullivan:				
Softwood	6,712	6,631	3,323	16,666
Hardwood	915	1,689	1,408	4,012
Total	7,627	8,320	4,731	20,678
All counties:				
Softwood	95,685	51,139	40,202	187,026
Hardwood	33,009	9,770	12,780	55,559
Total	128,694	60,909	52,982	242,585

^aInternational 1/4-inch rule.

Table 13.--Sawlog receipts in New Hampshire, by county, species group, and origin of shipment, 1982

(In thousands of board feet)^a

County and species group	Cut and retained in county	Logs received from:		Total receipts
		Other counties	Other states	
Belknap:				
Softwood	3,281	12,165	-	15,446
Hardwood	489	957	-	1,446
Total	3,770	13,122	-	16,892
Carroll:				
Softwood	6,083	1,270	447	7,800
Hardwood	1,005	340	40	1,385
Total	7,088	1,610	487	9,185
Cheshire:				
Softwood	8,911	2,470	3,024	14,405
Hardwood	6,583	2,001	2,105	10,689
Total	15,494	4,471	5,129	25,094
Coos:				
Softwood	6,321	4,860	3,521	14,702
Hardwood	8,269	145	2,855	11,269
Total	14,590	5,005	6,376	25,971
Grafton:				
Softwood	28,609	1,179	3,328	33,116
Hardwood	10,025	2,439	2,637	15,101
Total	38,634	3,618	5,965	48,217
Hillsborough:				
Softwood	9,003	1,877	2,796	13,676
Hardwood	605	75	241	921
Total	9,608	1,952	3,037	14,597
Merrimack:				
Softwood	17,810	13,757	1,132	32,699
Hardwood	2,605	2,435	312	5,352
Total	20,415	16,192	1,444	38,051

Table 13.--Continued

County and species group	Cut and retained in county	Logs received from:		Total receipts
		Other counties	Other states	
Rockingham:				
Softwood	7,688	2,049	53	9,790
Hardwood	2,334	510	12	2,856
Total	10,022	2,559	65	12,646
Strafford:				
Softwood	1,267	9,990	442	11,699
Hardwood	179	815	41	1,035
Total	1,446	10,805	483	12,734
Sullivan:				
Softwood	6,712	1,522	1,369	9,603
Hardwood	915	53	406	1,374
Total	7,627	1,575	1,775	10,977
All counties:				
Softwood	95,685	51,139	16,112	162,936
Hardwood	33,009	9,770	8,649	51,428
Total	128,694	60,909	24,761	214,364

^aInternational 1/4-inch rule.

Table 14.--Pulpwood production in New Hampshire,
by type of pulpwood, 1963 - 1982

(In thousands of rough cords)^a

Year	All types	Type of pulpwood		
		Roundwood		Chipped residues ^b
		Softwoods	Hardwoods	
1963	222.0	83.8	96.5	41.7
1964	240.0	108.3	77.3	54.4
1965	250.5	125.3	75.1	50.1
1966	284.9	112.8	110.4	61.7
1967	320.2	112.9	124.9	82.4
Total, 5 years	1,317.6	543.1	484.2	290.3
1968	335.5	92.8	157.1	85.6
1969	319.3	81.2	147.3	90.8
1970	304.5	47.2	151.9	105.4
1971	329.3	96.0	141.1	92.2
1972	311.4	63.9	136.8	110.7
Total, 5 years	1,600.0	381.1	734.2	484.7
1973	335.9	54.6	176.1	105.2
1974	390.2	62.6	188.5	139.1
1975	345.8	56.6	168.9	120.3
1976	327.9	56.2	131.6	140.1
1977	498.1	101.6	248.8	147.7
Total, 5 years	1,897.9	331.6	913.9	652.4
1978	508.1	128.6	195.6	183.9
1979	519.9	107.0	171.1	241.8
1980	479.9	92.5	161.6	225.8
1981	409.8	101.2	146.6	162.0
1982	522.7	142.6	186.9	193.2
Total, 5 years	2,440.4	571.9	861.8	1,006.7

^a128 cubic feet of wood, bark, and air space, or 85 cubic feet of solid wood.

^bRough cord equivalents.

Table 15.--Production and disposition of manufacturing plant residues,
by type of use and industry source, New Hampshire, 1982

Type of use	Type of residue			All types
	Bark	Coarse ^a	Fine ^b	
	----- <u>Thousand cubic feet</u> -----			
	LUMBER			
Fiber ^c	48	14,707	811	15,566
Industrial fuel	616	405	1,530	2,551
Domestic fuel	85	320	4	409
Agricultural ^d and other ^e	2,801	136	4,449	7,386
Total, used	3,550	15,568	6,794	25,912
Unused	71	21	58	150
	OTHER INDUSTRIES ^f			
Fiber	58	799	-	857
Industrial fuel	122	208	268	598
Domestic fuel	5	77	-	82
Agricultural and other	75	4	143	222
Total, used	260	1,088	411	1,759
Unused	5	68	1	74
	ALL INDUSTRIES			
Fiber	106	15,506	811	16,423
Industrial fuel	738	613	1,798	3,149
Domestic fuel	90	397	4	491
Agriculture and other	2,876	140	4,592	7,608
Total, used	3,810	16,656	7,205	27,671
Unused	76	89	59	224

Table 15.--continued

Type of use	Type of residue			All types
	Bark	Coarse ^a	Fine ^b	
----- Thousand cubic meters -----				
LUMBER				
Fiber ^c	1.4	416.5	23.0	440.9
Industrial fuel	17.4	11.5	43.3	72.2
Domestic fuel	2.4	9.1	.1	11.6
Agricultural ^d and other ^e	79.3	3.8	126.1	209.2
Total, used	100.5	440.9	192.5	733.9
Unused	2.0	.6	1.7	4.3
OTHER INDUSTRIES ^f				
Fiber	1.6	22.6	-	24.2
Industrial fuel	3.5	5.9	7.6	17.0
Domestic fuel	.2	2.1	-	2.3
Agricultural and other	2.1	.1	4.0	6.2
Total, used	7.4	30.7	11.6	49.7
Unused	.2	1.9	.0	2.1
ALL INDUSTRIES				
Fiber	3.0	439.1	23.0	465.1
Industrial fuel	20.9	17.4	50.9	89.2
Domestic fuel	2.6	11.2	.1	13.9
Agriculture	81.4	3.9	130.1	215.4
Total, used	107.9	471.6	204.1	783.6
Unused	2.2	2.5	1.7	6.4

^aIncludes slabs, edgings, trimmings, and other material suitable for chipping.

^bIncludes sawdust, shavings, and other material considered unsuitable for chipping.

^cIncludes woodpulp and composite materials.

^dIncludes livestock bedding, chicken litter, and farm and horticultural mulch.

^eIncludes miscellaneous uses such as small dimension and specialty items.

^fIncludes manufacturers of cabin logs, ties, cooperage, piling, poles, and dimension, fencing, shingles, turned products, and miscellaneous novelty and specialty items.

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Table 16.--Industrial roundwood production in Vermont,
by species group and major product, 1982

Species group	Sawlogs ^a	Veneer logs	Pulpwood	Other products ^b
	<u>Thousand board feet^c</u>		<u>Standard cords</u>	<u>Thousand cubic feet</u>
Hemlock	20,286	700	26,567	83
White pine	34,485	1,300	14,937	1,361
Spruce and fir	29,364	250	106,240	242
Other softwoods	3,757	-	313	677
Total softwoods	87,892	2,250	148,057	2,363
Ash	6,256	277	5,097	141
Beech	5,233	1,138	22,649	58
White birch	2,244	2,368	7,733	777
Yellow birch	6,630	1,089	30,435	81
Elm	562	36	870	8
Hard maple	29,672	907	47,425	794
Soft maple	4,465	740	22,986	20
Oaks	7,261	802	1,335	15
Other hardwoods	7,652	787	14,709	38
Total hardwoods	69,975	8,144	153,239	1,932
All species	157,867	10,394	301,296	4,295

^aIncludes boltwood sawn into lumber.

^bIncludes cabin and tie logs, cooperage logs and bolts, piling, poles, and stock for dimension, fencing, reconstituted-wood panel products, shingles, turned products, and miscellaneous novelty and specialty items.

^cInternational 1/4-inch rule.

Table 17.--Change in industrial roundwood production in Vermont, 1972 - 1982

Product	All species			Softwoods			Hardwoods		
	1972		1982	1972		1982	1972		1982
	Thousand cubic feet	Percent	Change	Thousand cubic feet	Percent	Change	Thousand cubic feet	Percent	Change
Sawlogs ^a	19,729	+25		8,460	+66		11,323		-6
Veneer logs	1,124	+43		--	b		1,124		+11
Pulpwood	11,519	b		4,836	b		6,683		+95
Poles and posts	435	-70		349	-65		86		-91
Other products ^c	3,264	+28		801	b		2,463		-22
Total	36,071	+56		14,446	+103		21,679		+24

^aIncludes boltwood sawn into lumber.^bGreater than 100 percent increase.^cIncludes cabin and tie logs, piling, and stock for dimension, fencing, reconstituted-wood panel products, shingles, turned products, and miscellaneous novelty and specialty items.

Table 18.--Industrial roundwood production for Vermont, by county, species group, and major product, 1982

(In thousands of cubic feet)

County and species group	Product			Total
	Sawlogs ^a	Pulpwood	Other ^b	
Addison:				
Softwood	242	67	61	370
Hardwood	1,043	73	62	1,178
Total	1,285	140	123	1,548
Bennington:				
Softwood	437	333	142	912
Hardwood	1,164	522	359	2,045
Total	1,601	855	501	2,957
Caledonia:				
Softwood	1,937	3,575	193	5,705
Hardwood	696	1,608	172	2,476
Total	2,633	5,183	365	8,181
Chittenden:				
Softwood	455	61	4	520
Hardwood	320	2	29	351
Total	775	63	33	871
Essex:				
Softwood	1,881	3,701	2	5,584
Hardwood	1,180	7,877	421	9,478
Total	3,061	11,578	423	15,062
Franklin and Grand Isle:				
Softwood	907	230	-	1,137
Hardwood	390	321	191	902
Total	1,297	551	191	2,039
Lamoille:				
Softwood	1,216	489	19	1,724
Hardwood	983	94	204	1,281
Total	2,199	583	223	3,005
Orange:				
Softwood	1,142	347	258	1,747
Hardwood	595	286	213	1,094
Total	1,737	633	471	2,841
Orleans:				
Softwood	700	1,980	517	3,197
Hardwood	352	1,162	195	1,709
Total	1,052	3,142	712	4,906

Table 18.--Continued

County and species group	Product			Total
	Sawlogs ^a	Pulpwood	Other ^b	
Rutland:				
Softwood	417	551	396	1,364
Hardwood	1,267	102	505	1,874
Total	1,684	653	901	3,238
Washington:				
Softwood	1,077	157	18	1,252
Hardwood	784	60	127	971
Total	1,861	217	145	2,223
Windham:				
Softwood	1,955	584	361	2,900
Hardwood	924	789	288	2,001
Total	2,879	1,373	649	4,901
Windsor:				
Softwood	1,704	510	752	2,966
Hardwood	966	129	411	1,506
Total	2,670	639	1,163	4,472
All counties:				
Softwood	14,070	12,585	2,723	29,378
Hardwood	10,664	13,025	3,177	26,866
Total	24,734	25,610	5,900	56,244

^aIncludes boltwood sawn into lumber.

^bIncludes cabin and tie logs, piling, poles, and stock for dimension, fencing, reconstituted-wood panel products, shingles, turned products, and miscellaneous novelty and specialty items.

Table 19.--Sawlog production and receipts in Vermont,
by county and species group, 1982

(In thousands of board feet)^a

County	Production		Receipts	
	Softwoods	Hardwoods	Softwoods	Hardwoods
Addison	1,515	6,844	2,825	16,576
Bennington	2,731	7,634	2,273	8,271
Caledonia	12,099	4,568	12,406	5,286
Chittenden	2,841	2,100	8,192	6,781
Essex	11,749	7,742	2,591	4,677
Franklin & Grand Isle	5,664	2,560	802	165
Lamoille	7,600	6,453	3,807	5,381
Orange	7,131	3,908	6,238	4,063
Orleans	4,375	2,309	2,187	1,428
Rutland	2,604	8,314	1,830	6,989
Washington	6,727	5,140	3,534	341
Windham	12,211	6,065	16,140	7,228
Windsor	10,645	6,338	16,307	6,293
All counties	87,892	69,975	79,132	73,479
All species	157,867		152,611	

^aInternational 1/4-inch rule.

Table 20.--Species composition of sawlogs produced in Vermont,
for selected years

(In percent)

Species	1900	1926	1952	1972	1982
Hemlock	11	10	17	8	13
White pine	5	8	19	23	22
Spruce and fir	70	21	23	12	19
Other hardwoods	b	b	2	1	2
Total softwoods	86	39	61	44	56
Ash	b	3	2	3	4
Basswood	1	2	1	b	b
Beech	-	9	5	6	3
Birch	4	18	11	12	6
Maple	5	27	17	31	22
Oak	2	1	2	3	4
Other hardwoods	2	1	1	1	5
Total hardwoods	14	61	39	56	44
All species	100	100	100	100	100
Volume of harvest (Million board feet) ^a	365.8	137.0	269.7	125.2	157.9

^aInternational 1/4-inch rule.

^bLess than 0.5 percent.

Table 21.--Sawlog production in Vermont, by county, species group, and destination of shipment, 1982

(In thousands of board feet)^a

County and species group	Cut and retained in county	Logs shipped to:		Total production
		Other counties	Other states	
Addison:				
Softwood	1,026	489	-	1,515
Hardwood	5,616	1,228	-	6,844
Total	6,642	1,717	-	8,359
Bennington:				
Softwood	1,100	871	760	2,731
Hardwood	2,534	1,460	3,640	7,634
Total	3,634	2,331	4,400	10,365
Caledonia:				
Softwood	7,787	1,286	3,026	12,099
Hardwood	2,342	947	1,279	4,568
Total	10,129	2,233	4,305	16,667
Chittenden:				
Softwood	2,548	293	-	2,841
Hardwood	847	1,237	16	2,100
Total	3,395	1,530	16	4,941
Essex:				
Softwood	1,004	537	10,208	11,749
Hardwood	788	1,035	5,919	7,742
Total	1,792	1,572	16,127	19,491
Franklin and Grand Isle:				
Softwood	772	1,070	3,822	5,664
Hardwood	164	2,267	129	2,560
Total	936	3,337	3,951	8,224
Lamoille:				
Softwood	2,609	3,532	1,459	7,600
Hardwood	2,692	3,627	134	6,453
Total	5,301	7,159	1,593	14,053
Orange:				
Softwood	2,938	3,114	1,079	7,131
Hardwood	2,421	1,310	177	3,908
Total	5,359	4,424	1,256	11,039
Orleans:				
Softwood	1,871	898	1,606	4,375
Hardwood	998	1,214	97	2,309
Total	2,869	2,112	1,703	6,684

Table 21.--Continued

County and species group	Cut and retained in county	Logs shipped to:		Total production
		Other counties	Other states	
Rutland:				
Softwood	1,504	640	460	2,604
Hardwood	2,914	4,256	1,144	8,314
Total	4,418	4,896	1,604	10,918
Washington:				
Softwood	2,995	3,645	87	6,727
Hardwood	321	4,793	26	5,140
Total	3,316	8,438	113	11,867
Windham:				
Softwood	10,703	484	1,024	12,211
Hardwood	4,563	1,287	215	6,065
Total	15,266	1,771	1,239	18,276
Windsor:				
Softwood	7,110	1,940	1,595	10,645
Hardwood	3,135	2,475	728	6,338
Total	10,245	4,415	2,323	16,983
All counties:				
Softwood	43,967	18,799	25,126	87,892
Hardwood	29,335	27,136	13,504	69,975
Total	73,302	45,935	38,630	157,867

^aInternational 1/4-inch rule.

Table 22.--Sawlog receipts in Vermont, by county, species group, and origin of shipment, 1982

(In thousands of board feet)^a

County and species group	Cut and retained in county	Logs received from:		Total receipts
		Other counties	Other states	
Addison:				
Softwood	1,026	1,545	254	2,825
Hardwood	5,616	8,964	1,996	16,576
Total	6,642	10,509	2,250	19,401
Bennington:				
Softwood	1,100	-	1,173	2,273
Hardwood	2,534	1,172	4,565	8,271
Total	3,634	1,172	5,738	10,544
Caledonia:				
Softwood	7,787	4,611	8	12,406
Hardwood	2,342	2,237	707	5,286
Total	10,129	6,848	715	17,692
Chittenden:				
Softwood	2,548	5,376	268	8,192
Hardwood	847	5,915	19	6,781
Total	3,395	11,291	287	14,973
Essex:				
Softwood	1,004	853	734	2,591
Hardwood	788	852	3,037	4,677
Total	1,792	1,705	3,771	7,268
Franklin and Grand Isle:				
Softwood	772	30	-	802
Hardwood	164	1	-	165
Total	936	31	-	967
Lamoille:				
Softwood	2,609	1,180	18	3,807
Hardwood	2,692	2,584	105	5,381
Total	5,301	3,764	123	9,188
Orange:				
Softwood	2,938	1,994	1,306	6,238
Hardwood	2,421	763	879	4,063
Total	5,359	2,757	2,185	10,301
Orleans:				
Softwood	1,871	316	-	2,187
Hardwood	998	430	-	1,428
Total	2,869	746	-	3,615

Table 22.--Continued

County and species group	Cut and retained in county	Logs received from:		Total receipts
		Other counties	Other states	
Rutland:				
Softwood	1,504	280	46	1,830
Hardwood	2,914	3,286	789	6,989
Total	4,418	3,566	835	8,819
Washington:				
Softwood	2,995	485	54	3,534
Hardwood	321	20	-	341
Total	3,316	505	54	3,875
Windham:				
Softwood	10,703	491	4,946	16,140
Hardwood	4,563	289	2,376	7,228
Total	15,266	780	7,322	23,368
Windsor:				
Softwood	7,110	1,638	7,559	16,307
Hardwood	3,135	623	2,535	6,293
Total	10,245	2,261	10,094	22,600
All counties:				
Softwood	43,967	18,799	16,366	79,132
Hardwood	29,335	27,136	17,008	73,479
Total	73,302	45,935	33,374	152,611

^aInternational 1/4-inch rule.

Table 23.--Pulpwood production in Vermont,
by type of pulpwood, 1963 - 1982

(In thousands of rough cords)^a

Year	All types	Type of pulpwood		
		Roundwood		Chipped residues ^b
		Softwoods	Hardwoods	
1963	173.8	110.5	45.0	18.3
1964	173.7	114.2	35.5	24.0
1965	150.1	87.0	26.0	37.1
1966	145.1	97.1	28.9	19.1
1967	147.0	93.8	33.7	19.5
Total, 5 years	789.7	502.6	169.1	118.0
1968	149.4	83.2	37.6	28.6
1969	142.1	61.7	45.5	34.9
1970	149.3	75.7	49.1	24.5
1971	148.3	61.7	59.2	27.4
1972	166.6	56.9	78.6	31.1
Total, 5 years	755.7	339.2	270.0	146.5
1973	193.3	63.9	76.5	52.9
1974	258.5	107.1	90.7	60.7
1975	209.5	71.6	93.4	44.5
1976	216.2	90.0	81.6	44.6
1977	293.0	93.7	125.7	73.6
Total, 5 years	1,170.5	426.3	467.9	276.3
1978	287.8	96.0	116.1	75.7
1979	378.6	116.5	174.5	87.6
1980	376.2	127.7	169.3	79.2
1981	342.5	159.0	124.4	59.1
1982	356.2	148.1	153.2	54.9
Total, 5 years	1,741.3	647.3	737.5	356.5

^a 128 cubic feet of wood, bark, and air space, or 85 cubic feet of solid wood.
^b Rough cord equivalents.

Table 24.--Veneer log production^a and receipts, by species, and destination and origin of shipment, Vermont, 1982
(In thousands of board feet)^b

Species	Cut and retained in Vermont	Exported to:				Total production	Imported from:				Total receipts
		Maine	Hampshire	New York	Quebec		Conn.	Maine	Mass.	New Hampshire	
Hardwoods:											
Ash	273	-	-	4	-	277	66	30	65	240	356
Aspen	657	-	-	-	-	657	-	-	35	21	35
Basswood	35	-	-	-	-	35	-	100	2	-	62
Beech	1,065	-	-	73	-	1,138	-	-	58	34	58
White birch	1,427	358	250	333	-	2,368	9	60	232	206	112
Yellow birch	1,089	-	-	-	-	1,089	60	186	49	1,104	1,084
Elm	36	-	-	-	-	36	-	-	2	1	2
Hard maple	748	-	-	159	-	907	-	30	38	62	68
Soft maple	679	-	-	61	-	740	-	-	37	22	37
Red oak	737	-	-	-	65	802	1,054	100	316	1,056	2,312
Other hardwoods	82	-	-	13	-	95	-	-	5	148	5
Total	6,828	358	250	643	65	8,144	1,189	506	839	2,894	4,131
Softwoods: ^c	-	-	-	2,250	-	2,250	-	-	-	-	-
All species	6,828	358	250	2,893	65	10,394	1,189	506	839	2,894	4,131
Total											16,387

^aVeneer logs handled by brokers for overseas shipment are not included.

^bInternational 1/4-inch rule.

^cSoftwoods include 700 thousand board feet of hemlock, 250 thousand board feet of spruce and fir, and 1,300 thousand board feet of white pine shipped to New York.

Table 25.--Production and disposition of manufacturing plant residues,
by type of use and industry source, Vermont, 1982

Type of use	Type of residue			All types
	Bark	Coarse ^a	Fine ^b	
	<u>Thousand cubic feet</u>			
LUMBER				
Fiber ^c	-	3,651	-	3,651
Industrial fuel	529	1,243	446	2,218
Domestic fuel	305	838	53	1,196
Agricultural ^d and other ^e	1,557	57	3,904	5,518
Total, used	2,391	5,789	4,403	12,583
Unused	209	175	18	402
VENEER				
Fiber	-	247	612	859
Industrial fuel	305	441	137	883
Domestic fuel	-	151	-	151
Agricultural and other	-	-	26	26
Total, used	305	839	775	1,919
Unused	-	-	-	-
OTHER INDUSTRIES ^f				
Fiber	-	154	-	154
Industrial fuel	87	218	154	459
Domestic fuel	24	151	2	177
Agricultural and other	57	1	159	217
Total, used	168	524	315	1,007
Unused	29	71	4	104
ALL INDUSTRIES				
Fiber	-	4,052	612	4,664
Industrial fuel	921	1,902	737	3,560
Domestic fuel	329	1,140	55	1,524
Agricultural and other	1,614	58	4,089	5,761
Total, used	2,864	7,152	5,493	15,509
Unused	238	246	22	506

Table 25.--continued

Type of use	Type of residue			All types
	Bark	Coarse ^a	Fine ^b	
-----Thousand cubic meters-----				
LUMBER				
Fiber ^c	-	103.4	-	103.4
Industrial fuel	15.0	35.2	12.6	62.8
Domestic fuel	8.6	23.7	1.6	33.9
Agricultural ^d and other ^e	44.1	1.6	110.6	156.3
Total, used	67.7	163.9	124.8	356.4
Unused	5.9	5.0	.5	11.4
VENEER				
Fiber	-	7.0	17.3	24.3
Industrial fuel	8.6	12.5	3.9	25.0
Domestic fuel	-	4.3	-	4.3
Agricultural and other	-	-	.7	.7
Total, used	8.6	23.8	21.9	54.3
Unused	-	-	-	-
OTHER INDUSTRIES ^f				
Fiber	-	4.4	-	4.4
Industrial fuel	2.5	6.2	4.4	13.1
Domestic fuel	.7	4.3	-	5.0
Agricultural and other	1.6	.0	4.5	6.1
Total, used	4.8	14.9	8.9	28.6
Unused	.8	2.0	.1	2.9
ALL INDUSTRIES				
Fiber	-	114.8	17.3	132.1
Industrial fuel	26.1	53.9	20.9	100.9
Domestic fuel	9.3	32.3	1.6	43.2
Agricultural and other	45.7	1.6	115.8	163.1
Total, used	81.1	202.6	155.6	439.3
Unused	6.7	7.0	.6	14.3

^aIncludes slabs, edgings, trimmings, and other material suitable for chipping.

^bIncludes sawdust, shavings, and other material considered unsuitable for chipping.

^cIncludes woodpulp and composite materials.

^dIncludes livestock bedding, chicken litter, and farm and horticultural mulch.

^eIncludes miscellaneous uses such as small dimension and specialty items.

^fIncludes manufacturers of cabin logs, ties, cooperage, piling, poles, and dimension, fencing, shingles, turned products, and miscellaneous novelty and specialty items.

Round Timber Conversions for Major Products

Softwood sawlogs: M bf(International 1/4-inch rule) = $160.1 \text{ ft}^3 = 4.54 \text{ m}^3$

Hardwood sawlogs: M bf(International 1/4-inch rule) = $152.4 \text{ ft}^3 = 4.32 \text{ m}^3$

Pulpwood and turnery bolts: 1 standard cord = 85 ft^3 of solid wood =
 2.41 m^3 = about 2.8 green tons for hardwoods and
about 2.3 green tons for softwoods

Veneer and cooperage logs and bolts: M bf(International 1/4-inch rule) =
 $152.9 \text{ ft}^3 = 4.33 \text{ m}^3$

☆U.S. GOVERNMENT PRINTING OFFICE: 1986-605-026-40000

Nevel, Robert L., Jr.; Engalichev, Nicolas; and Gove, William G. The timber industries of New Hampshire and Vermont--a periodic assessment of timber output. Resour. Bull. NE-89. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1986. 56 p.

Reports the results of a survey of the timber industries of New Hampshire and Vermont; contains statistics on industrial timber production and receipts, and production and disposition of the manufacturing residues. Comparisons are made with most recent data, and trends in industrial wood output are noted. Includes 25 statistical tables.

ODC 792:83(742)(743)

Keywords: Timber output, wood residues use, New Hampshire manufacturers, Vermont manufacturers, production statistics.

Headquarters of the Northeastern Forest Experiment Station are in Broomall, Pa. Field laboratories are maintained at:

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